DRAGON USER

The independent Dragon magazine

October 1987

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Gordon Lee's own solution to the July competition.

STOP PRESS+STOP PRESS+STOP PRESS

John Penn Software are organising a 6809 Show in London at the Great Hall, the Connaught Rooms, Aldwych on Saturday December 5th. More news next month.

Brian Cadge is on holiday.

Editorial

IT'S apologies month again this month. Everything will be resolved, of course, by the time you read this, but I would just like you to know that my first thought, when I was told that *Dragon User* wouldn't be mailed till the 7th September, was "They'll lynch me in Rochdale!".

What I can't tell you just yet is whether they *did* lynch me in Rochdale. I can't even plead with'em not to. It's too early for t'one and too late for t'other. All I can say is that, well, we were a teeny bit late to the printers. Not two whole weeks late, but, well, late is late, isn't it?

Trouble is, if you leave the office for a week, your hardworking friends and colleagues can do one of two things: a) something or b) nothing. B) normally causes fewer problems. Normally. Fortunately, the ghost of the much missed Barbora, who hid a few spare days in the timetable, and the long suffering Artext "send us your discs and we'll show you what you can do with'em" made sure that we were stuck down and parcelled up rather less late than we would otherwise have been.

By the way, it's a little known fact that designers of computer mags gradually go insane. There are only so many things you can do, visually that is, with little black boxes. Editors don't, of course (... burble ...)

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How to submit articles

The quality of the material we can publish in *Dragon User* each month will, to a very great extent depend on the quality of the discoveries that you can make with your Dragon. The Dragon computer was launched on to the market with a powerful version of Basic, but with very poor documentation.

Articles which are submitted to *Dragon User* for publication should not be more than 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program returned you must include a stamped addressed envelope.

Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.

Mystery draw

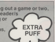
WHILE reading DU August 1986 I came across an item called *Graphics* by J.H.Plester in Dragon Answers. So here is something for Mr. Plester to add to it:

```
10 PMODE 2,1:SCREEN 1,0
20 POKE &HFF22,(PEEK
(&HFF22)AND 6)
15 DATA 121,12,12,12,12,12,
12,12,12,13,33
30 GOTO 10
or
20 POKE &HFF22,(PEEK
(&HFF23)AND 6)
or
20 POKE &HFF22,(PEEK
(&HFF20)AND 7)
or
20 POKE &HFF22,(PEEK
(&HFF19)AND 8)
or
20 POKE &HFF22,(PEEK
(&HFF18)AND 9)
or
20 POKE &HFF22,(PEEK
(&HFF15)AND 2)
```

If there's any complaints about the above, please contact or phone me. And could J. H. Plester, and Simon of Crawley Hill Farm who wanted help with *Syzygy* get in touch. Sorry, Simon.

Paul Iasikiewicz
40, Sidlay Avenue
Parr St. Helens
Merseyside
WA9 2BQ
(St. Helens) 611827 (between 4 and 4.30pm).

Every month we will be shelling out a game or two, courtesy of Microdeal, to the reader/s who send the most interesting or entertaining letters. So send us your hints and your opinions, send us your hi-scores and suggestions. Send us your best Dragon stories. What d'you think we are, mind readers?!



There's gold in them thar bills!

AS new software is now almost extinct I would like to pass on my experience of obtaining software direct from Canada and America. Payment can easily be arranged on any of the major credit cards.

I ordered *Gantelet* and *Paper Route* from Canada by phone at about 9pm in the UK. Due to the time difference it was early afternoon in Canada. The games took about 1 month to arrive. They both ran without conversion on a Dragon 64 except if you use the keyboard mode instead of using the joystick as the keyboard scan is different, although this can be overcome by using different keys.

The main drawback is that the games cost about £30 each including shipping. Custom duties and charges add another £5 when they enter this country.

I hope the above information may prove useful to anyone thinking of ordering direct from an American or Canadian source.

R.K. Osborne
18A Northdown Avenue
Cliftonville
Kent
CT9 2NW

AND who has recently inherited their aunty's estates ... well, that should stop folk complaining about the cost of new software here for a bit.

Anyone who is this dedicated deserves one free tape, I reckon, but we would be interested to hear from anyone who has a (legitimate) method of getting compatible software from the USA without having to pay £35 a shot!

Write-a-DOS?

COMMERCIAL support for the Dragon is not very good to put it mildly, although some interesting new names and items have appeared of late. One thing I have noticed though is if someone says there is a special need for some particular program or item, especially in your pages, it seems to spark somewhere an "I can produce that!" from somewhere.

So what's the point of this? Well I have spotted a market gap and I want someone to fill it. The books-on-anything-computer phase ended as the DRAGONDOS appeared on the scene, and the manual supporting it is abysmal. I would like a good book on this peripheral, starting with simple use and programming, fully covering file handling in an easy to follow manner with plenty of short example programs, and going on to memory maps etc. I am sure there is more than one person out there with the knowledge and skill to write such a book, and a market for it once written. Perhaps Sunshine will take you up and do the actual publishing??? If not I see no reason why it needn't be in printed, photocopied, or duplicated form. You might even make a bit of money!

Philip Beed
27 Findon Road
Elson
Gosport
Hants PO12 4EP

WELL, money is something there isn't a lot of about, as we all know, but you never know, do you? Just out of idle curiosity, *is* there anyone out there who has the onions to write a book like this?

Out of print

HAVING read with interest your review *Take Ten Printers* in the July edition of *Dragon User*, I was very impressed with the report on the Tandy DMP105 by Ian Martin. He suggested that the competitive price is £120, but has since been reduced to £99.95. With this information in mind I paid visit to my local Tandy shop. I asked the salesman if I might see the DMP105 at work, to which he replied, 'Sorry! That model was discontinued at Christmas.' The printer has been replaced by the DMP106, but the price has increased considerably to £169.95.

The review now seemed rather pointless and as you can imagine I am very disappointed.

Now after the complaint: please can you give any information as to where I may obtain *Buzzard Bait* by Tom Mix? The only copy I have seen locally is at Tandy's and that was for the CoCo and would not even load into the Dragon. As this is one of the games recently under review by *Dragon User*, I wondered if you can supply a source?

Dennis Wright
37 Moor Drive
Alvaston
Derby DE2 0DQ

NOW, dang my eyes, but I'll be darned if I can find a review of *Buzzard Bait* around the old place just now. There's one in my brown paper bag ... perhaps we'll run it. But the word is that Microdeal, who used to sell it, no longer do so, so unless you can beg, borrow or steal one, it's no longer available.

Help with old WP?

I HAVE recently been experimenting with *Coding the Words*, Peter Whittaker's Word Processor in the September 1985 issue of *Dragon User*. I think it is an excellent program and if more software like this had been available commercially earlier on, the Dragon would still be selling in its thousands today.

However, I have two problems and would be grateful if Peter or one of your other readers could assist. Firstly, I am not a very good touch typist and would like to increase the auto repeat delay so that I do not repeeeeeeated leeeeetters; is there some location I can POKE with a longer delay? The second problem is more difficult, when I save to disc, after entering the 8 character file name followed by ⟨ENTER⟩ the disc motor starts, the busy light comes on, the head moves and it stays like this for 10 minutes or more until I press the ⟨RESET⟩ button; on checking the directory, no file has been written. If I try to load a file, any file, the program crashes with an FM error. I presume that Peter uses a different disc controller and that he is making calls to routines which reside in different locations. I should be most grateful for any help in converting the program, even if it is only a list of the disc routine calls used by Peter.

Mrs Bernice Hennessy
The Firs
8 Towcester Rd
Blisworth Northampton
NN7 3BL

UNFORTUNATELY, we have lost touch with Peter after efforts to locate him. Perhaps another reader can help.

Double spaced Stylo

I am a Spanish member of the OS-9 User Group and subscriptor of your good magazine. I write you about the article of David Rothery and the correction of the double space printing with the Stylograph program.

Well, making the change that he proposes the printing is correct with both Stylo and MM. But if you try to use the MM with the screen, it doesn't work properly and in addition both programs dfon't respond to the Xmode set ups.

The problem of the double space printing, in both programs, comes from the use of a system calling. The characters are sent to the printer one by one, with a I$Write calling. This calling doesn't allow line editing, and to end a line it is necessary to send a CR + LF sequence. This causes the double space printing ignoring the Xmode set ups.

To avoid this dreaded problem I have changed the I$Write calling by a I$WritLn, which allows line editing, and I have nullified the LF sequence with NOP instructions. With this change in both programs the printing is correct on the printer and the screen, and always follows the Xmode set up conditions.

This is the process to make the changes with the systems disc (with the Debugger) in /D0 and the Stylo in /D1:

```
DEBUG
$ LOAD /d1/cmds/stylo
L stylo
. . + 012E
 = 8C
L stylo
. . + 3F4F
 = 12
 = 12
 = 12
 = 12
Q
SAVE /d1/cmds/stylo.mod stylo
DEL /d1/cmds/stylo
VERIFY  U  ⟨/d1/cmds/stylo.
mod ⟩/d1/cmds/stylo
DEL /d1/cmds/stylo.mod
ATTR /d1/cmds/stylo e pe
```

The process for the Mail Merge is the same with the addresses + 00F3 and + 191D.

I hope that this change will be a definitive solution for this problem. Apologies for my English. Thank you for you attention.

Pedro M. Pascual Uriguen
Santaines Kalea 6-B
20600 Eibar (Gipuzkoa)
Euskadi Spain

Quick Tally mod

I WAS very interested to read your article on printer and I myself own the Mannesman Tally 80 + and have found the variety of print modes and character sets to be very useful in writing technical reports for my degree course at the local polytechnic.

It can be found, if the top ocver is removed, that on the left under the input card are two sockets marked Ram 1 & Ram 2, the card is held in place by two screws and should be removed by lifting it directly upwards as it is plugged into the board below, now if two 6116 memory chips are fitted in these sockets then the input buffer will be increased to 4K (as opposed to only 112 bytes which is the standard). The cost of the chips is only about £4.50 and this included the postage and putting the chips into the sockets can be done by all but the very clumsiest of oafs.

I hope this information will be of interest to your readers.

C. Hitchinson
2 Newington Rd
Beechwood
Middlesbrough
Cleveland TS4 3ED

PS I bought the chips from Grandata Ltd. for £1.60p + VAT + 50p postage. The address can be found in *Practical Electronics*.

Better video?

SINCE the Dragon came out, people are trying to upgrade it to give it a better video performance. The Tandy Coco has managed it by having a raster memory system by Motorola installed, the Dragon got stuck by having an out of date video system.

Compusense with its upgrade board had better used the NEC7220 instead of an out of date MC6845, then when all is in RAM, one could modify the Basic to use the 7220 to full potential:

a) 128 columns x 72 lines, more then A4 page (using an A4 or double A4 monitor by ETAP, Belgium)

b) High resolution of 768 x 576 pixels, better than Atari ST or Amiga or IBM PS/2

c) Using analog video, unlimited colours, CAD/CAM possibilities.

d) 128K Video RAM used by the 7220 only, not interfering with the Dragon's own 64K, etc., or having a complete new RAM board of 1Mb.

For quite a while a British firm called Micro Concepts has had another solution: Microbox II.

One can order it as a kit or as a complete package, take your pick, they can be reached at 2 St. Stephen Road, Cheltenham, Gloucestershire GL5 1AA, phone (0242) 510525.

Maarten 'AMJ' Van Wamelen
3 Lynmetestraat
Oedelem 8330
Belgium

Cluster correction

THANK you for publishing the article *Into the Directory* in the May issue, and for the program ReadDD.

However I feel I should point out to Paul Dalgleish, a misunderstanding he has. He comments that the device descriptors are set up for 8 sector clusters and so Dragon discs will not read directly. In fact the OS-9 device descriptors do not contain any reference to the cluster size. This is chosen by the format program and written onto the identification sector of the disc. The byte Mr Dalgleish specifies to change should have no effect at all on the operation of the program. The byte referred to is called the 'Segment Allocation Size' and is the minimum number of sectors allocated to a file. See page 6-4 (4th paragraph) of the OS-9 Systems Programmers Manual. If the file is shorter that 8 sectors then when the file is closed, these extra sectors are de-allocated from the file. If you have two or more files open for writing simultaneously and you have altered the device descriptor as Mr Dalgleish suggest you could get a 'Segment List Full' error due to excessive fragmentation of the files. This byte is therefore best left as it is. The program ReadDD works perfectly well anyway.

To check the cluster size, try using the FREE command. This displays the cluster size amongst its output.

P D Smith
University Hall
Birchwood Road
Penylan
Cardiff
CF2 5YB

Thanks and a favour...

FIRSTLY may I thank yourselves for your backing and continual support for Dragon owners. It is organisations such as yours that help keep our family of together.

Next I would like to thank the Hardware and Software Businesses for supplying these owners with their necessary fodder if you will excuse the term.

Finally I must congratulate all the owners of Dragon and Tandy (never forget the Tandy owners) Machines for not discarding their computers in pursuit of poxy (forgive me if 'poxy' is a bit strong) machines such as Sinclair — say no more, Atari etc.. It is the owners themselves whom deserve congratulating as they keep a computer alive and I am sure they will continue to support their suppliers.

Could I please ask you to print my name and address along with this letter so I can get in touch with other Dragon owners and swap games, tips, and for the female contingent — telephone numbers?

Steve Clements
397 The Heathway
Shard End
Birmingham
B34 6QN

WHY's that, ay? Fink only the birds have telephones do yer? What about us chaps, then? Ay? Ay?

News desk

New disc set to chart

THE lady with a 3 inch disc clinging to her ear is part of a new advertising campaign by TDK, already well known for their video and audio cassette tapes.

TDK haven't made it clear yet whether the new range will include 3.25in or 5in discs, but TDK magnetic tape is already a byword for good quality, so they could become a major force in the disc market in future.

But they are not likely to start any trends in the earring business.

Dragon User back issues

FOLLOWING the launch of Pulser Software's database program *Magbase*, with an optional *Dragon User* index, this seems like a good time to print a list of DU back issue still available.

We have small quantities (under 20 copies) of the following:

August 1983, December 1983, February 1984, March 1984, May 1984, June 1984, August 1984, September 1984, October 1984, November 1984, January 1985, February 1985, March 1985, June 1985, November 1985, January 1986, February 1986, March 1986, May 1986.

We have substantial quantities (over 50 copies) of September 1985, December 1985, April 1986, August 1986, September 1986, October 1986, November 1986, December 1986 (which contains adverts from virtually every supplier still in the Dragon market, including one or two recent drop-outs, and as such is a useful work of reference) and all 1987 issues.

We have a very small number of September 1983, November 1983, January 1984, April 1984, July 1984 and July 1986. Don't order those — drop the Editor a line if you want copies, and we will check with the warehouse and let you know, after which we will deal with any orders on a first come first serve basis. This will help us to avoid losing track of orders for issues which may or may not be in stock.

Backnumbers of *Dragon User* cost £1.25 regardless of quantity or rarity! Please send any orders to the usual address, making payments out to Scot Press Ltd.

Magbase price list

HERE is a full list of prices for the different versions of Pulser Software's *Magbase*:

Tape version: £1.99; disc version: £2.99; tape version with *Dragon User* files: £2.99; disc version with *Dragon User* files: £3.99; *Dragon User* hard copy only: £1.99; tape version + DU files + Du hard copy: £3.99; disc version + DU files + hard copy: £4.99. Post and packing is 50p, except for the DU hard copy only, where it is 25p. Overseas postage is £1.25.

Cheques should be crossed and made payable to Pulser Software at 36 Foxhill, High Crompton, Shaw, Oldham, Lancs OL2 7NQ.

The disc versions are available for **DragonDos, CumanaDos 2.0 and Delta Dos**, so specify which version you want.

We understand that there are also index files available for *Dragon Update*.

Solver Steps Out

SIMON 'The Solver' Hargrave would like to announce the release of his new range of adventure games.

'As I have the reputation of 'The Solver' you will not expect them to be easy!' writes Simon. The titles are as follows:

Starcrash — a space adventure in which you are trapped on a hostile planet with a sinisher secret.

The King's Quest — 'an indirect continuation of *Starcrash*'. You are trapped in a castle on 12th century Earth at the mercy of a mad king.

The Quest for the Meaning of Life — You have control over four characters, and must use them to find the answer to the meaning of life.

All the games will run on a Dragon 32 or 64. Simon is currently working on Tandy conversions. The games all have mobile creatures and play in real time, except *Starcrash*, which uses mock real time.

There are various little additions to the keyboard parset, including a orange/green option from the Break key, and a printer history of your moves by using SHIFT and the UP arrow. But again, not on *Starcrash*.

The adventures cost £5 each (including post and packing. Allow 28 days for delivery) from Simon Hargrave, Crawley Hill Farm, Uley, Dursley, Glos. GL11 5BH.

Simon also sells solution sheets for many adventures. They cost 20p each. Send an SAE to Simon for more information.

Missing person

WE'RE still hoping Mr. John Carmel will contact us about another reader who was trying to get a letter to him.

Editor adjusts eyeshade

SINCE I have a couple of spare column inches this looks like a good time for me, your Editor, to offer both an apology and an appeal to DU's loyal and patient subscribers. The subject of enquiries from beleaguered users raised its head today in the form of a mild grumble from one reader who had "sent in queries with the appropriate 'coupon' but neither were printed or acknowledged", and another from a hopeful who had enclosed an Adventure Trail coupon with a stamped self-addressed envlope, asking for a reply.

Well, nothing makes me happier than a reader who contacts this office with a heart full of woe, and goes away happy, as the lucky ones will testify. If we get a letter — or a call, but letters are more likely to reach the right person — and we can supply the answer, then we jolly well do, even if we have to sit on it for a long time. And if none of the contributors can supply an answer directly, enquiries are re-routed to *Communications*, *Adventure Helpline* or the letters page

BUT

The Dragon is a little magazine with a little staff (most of those good people with their names on the flannel panel run the company rather than the magazine) and for this reason we have never, ever, at least not since well before my time, undertaken to reply personally to letters, no matter how many SAEs arrive with'em. Nor do we run any kind of coupon system for replies. Everything which arrives here on a COMMS or ADHELP coupon gets listed in the next available issue of *Dragon User*, just like it says on the coupon. After that, it's in the hands of you, gentle readers.

Likewise, Mr. Gerrard is the only one of our contributors who offers a readers' service, and that only involves the adventure help sheets. This is still strictly at his discretion, because the Mine Workers and Computer Journalists Act of 1983 states that we are not allowed to keep workers in a deep dark hole and make them slave for a pittance until their fingers drop off. We do it anyway, but we have to keep up appearances.

Gordon Lee isn't allowed to discuss competition results with *anyone* (which is the universal rule for competition organisers), and although he has been known to courteously apologise for our typos, these are normally corrected in subsequent issues.

The appearance of a 'Secretary' on our front page leads a few hopeful souls to picture me, feet on desk, carelessly dictating missives to a fast-fingered assistant. Wrong. The fast-fingered assistant is tied up typing out this your regular magazine for the typesetters, in between answering the phone and being shouted at by people who want stationery. She is concerned with nothing so humble as typing letters. If I want a letter typed, I type it myself. If the W/P isn't tied up on official business. Which is why those of you who do get a reply usually get a comp slip scribbled in what looks like red biro. (It's actually blood flowing from under my careworn fingernails. Journalists always write in their own blood, because its cheap, refillable, and doesn't need a requisition.)

So, we are sorry we can't offer a slicker readers' service, but it was a choice between getting another assistant or keeping the magazine on, y'see...we will go on coping with as many queries as we can. Please don't feel neglected if you don't hear from us personally. And yes, it *is* worth chasing if you have something you are concerned about, in case it has gone astray. Write, or call 'n' leave a message. Live dangerously! But don't ask them where I am. Some things it is better for humankind not to know, and they usually don't.

Now if you'll excuse me, I must go and write a couple of letters.

Dragonsoft

New software for review should be sent to *Dragon User*
12-13 Little Newport Street, London WC2H 7PP.

A PC when you need one

Program: *Dragon/PC Convert*
Supplier: Compusense
Price: £24.95

HOME computers have been around long enough now for everyone to have seen, played, and usually lost interest in, most forms of computer game. Having exhausted the seemingly endless supply of games, most people sit down and begin to wonder to what practical use they can put their beloved micro to. It is at this time that most people realise that for any 'real' application the Dragon has many shortcomings such as poor communications ability, awful screen display, slow working speed, lack of software etc., and with the increasing number of desk-top computers finding their way into offices, more and more people are becoming aware of just what is possible with a decent micro. It is due to these and other reasons that many home computer users are either using their Dragons to prop doors open and forgetting computers completely or are going out and buying something with a little more Whoomph.

The popular choices at the moment seem to be either the Atari STs or the ubiquitous IBM-PC or one of its many clones. But there are a small number of people who still keep the old Dragon handy simply because they have so much software or data for it. Having had to change computers several times in the past myself, I know that it can be very frustrating when you face a programming problem to which you already have the solution on an 'old' machine. Well now thanks to Compusense's *PC Convert* packages it is a simple matter for you to copy them over to your new pride and joy(?).

There are currently two *Convert* packages available, one will transfer DragonDOS files (either dBASic or TeXT) to the IBM PC or one of its many compatibles. The packages are so easy to use that there is little to say about them!

Using *Convert* program couldn't be easier, you simply boot the PC and run it. A menu is displayed giving options that allow you to select the target path-name, target disc drive number, show the source disc directory etc., make your choices, put the DragonDOS/FlexDOS disc in one PC drive, a formatted PC disc in the other drive and make your selection from the disc directory displayed. The drives whirr, the cursor blinks, and voila! your precious file is now available as a PC format text file.

For someone moving up (?) to a PC these programs are simply essential. Those of you who have decided to stay with your Dragon will not be interested in this review anyway (And I don't care!). If you have bought a PC then buy *PC Convert*!

Roy Coates

Put your left arm up...

Program: *Crazy Foota*
Supplier: Computape
Price: £2.99
Notes: Available on cassette and DragonDOS ffor Dragon 32 and 64. Requires two players.

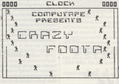
IT was very appropriate that this game should arrive on the day that the English football season kicks off. If there's anyone out there who hasn't twigged yet, then I'll tell you that *Crazy Foota* is a football game, OK?

It is also an unusual football game, in that it's not like *Champions* or *Football Manager*, where you decide the club's moves and if all goes well and the odds are on your side you'll have a good chance of winning. In *Crazy Foota* you control your team and battle away with the other team, controlling all the players and scoring all the goals.

The object of the game is to score as many goals as you can against your opponent within a set time. To select a player, you move an arrow on your side of the screen using a joystick, then left/right to move the player. This process takes a while to master. The fire botton kick is the ball in the direction which the joystick is facing. This allows you to pass the ball or shoot.

The game is played in PMODE4, and because there is no colour it is hard to distinguish between your own players and the opposition. However, if you look closely one team has its right hands up in the air, and the other team has its left hands up, which makes all the players look as if they are about to do a Highland Fling.

There are eleven players in eachteam, which means 22



Dragonsoft

New software for review should be sent to *Dragon User*
12-13 Little Newport Street, London WC2H 7PP.

figures packed into one little screen. This does get a mite confusing.

The graphics are simple but nice, and the players look surprisingly like Jack (from *Beanstalker*). The title music is also fairly simple. The cheers from the crowd sound like a constipated cat.

There are a number of faults in the game which spoil an otherwise enjoyable program. Firstly, the goals are larger than the goalie, which means that you can score by shooting diagonally over his head or under his legs. It sounds fair but it is annoying. Secondly, you can walk straight into a player and take the ball away from him. This is especially annoying when it's the opposition's keeper who is the culprit, because he can walk straight into your goal leaving you unable to catch up. Finally, because you can walk through a player, it is possible to walk through the other keeper's goals while he is standing in them, and he cannot block your way (or you his). You simply push him further into the goals, and there's nothing you can do about it.

It's nice to see Computape release something new by themselves, although the presentation is rather amateurish. The inlay is made up of a thin piece of yellow paper with a print of a screen shot. How about a bit of colour with some proper pictures! Apart from the said problems, I found the game very enjoyable and it is well worth the price of £2.99.

Donald Morrison

Program: *Kamakarzy*
Supplier: R&A Preston
Price: £2.99

THIS is a version of the old arcade game where you have to collect all the flags in a maze inhabited by the other cars which are out to kill you ('Kamakarzy drivers'), your only defence is to release clouds of smoke from your car. You have to watch your fuel guage or else your car will meet with a sticky end, thankfully there are fuel cans dotted about the screen. As in the arcade the screen scrolls as you look for the flags. On later levels there are more obstacles and even more mad drivers out to get you! On screen 2 there are giant cabbages which block the routes to the flags and make life that bit harder.

Everything in this game is done professionally; the car explodes then the remaining parts spins round when you die, the title screen has a very good tune which complements the screen and even the way you enter the name in the hi-score table is easy to do. When you load the game you should stick with it as it hasn't crashed but is supposed to load that way.

Even though this quite and old game it is still worth every penny.

Stephen Cogan

Life is full of little ups and downs

Program: *Biorhythms*
Supplier: Occult Software
Price: No information

BIORHYTHMS are one of those things that like horoscopes you either believe in or you don't. For those that don't know, followers of biorythms maintain that the three main facets of your personality (intellect, emotions and physical well-being) go through 'cycles' during which time they vary in strength. The lengths of these cycles differ in that the cycles are of 33, 28 and 23 days duration respectively hence the need for a computer to calculate their current positions.

The program comes on cassette with a series of printer drivers on side A for Epson, Seikosha GP100A and Shinwa CP80. The *Biorhythms* program itself is on side two and having loaded starts by giving you a choice of foreground and background colours (black, buff and green since it is all in PMODE4) and then asks for the 'subjects' name and date of birth, Having entered this initial information you may then enter the 'target' month that you wish the biorythms to be calculated for. This is where the fun starts.

The program begins by calculating the number of days that have elapsed since the birthdate and the target month LAST YEAR. (Allowances are made for leap years). The program then goes on to add the number of days month by month until the target month is reached. Eventually (and I mean EVENTUALLY), a graph is drawn for the target month showing the status of each of the three cycles and showing the 'critical' days at which time things are at an all time low. You have the option to print the graph or to go on and get the biorythms for the next month but that is IT.

If you are a biorythm believer then the information shown will make you very happy. I am not a believer and so the output of the program is as exciting to me as an empty beer can, (not a bad analogy that eh? since I don't posess Jason's literary wit, when God was dishing that out Jason was at the front of the queue and I was in beer tent!), but what annoyed me was the fact that the progam shows all of its calculations one step at a time and after each step you must press a key to continue to the next.

This would not normally be too bad but because the steps are shown on the hi-res screen using an immeasurably slow text driver I found myself reading the paper and occasionally nudging the space-bar with my elbow.

The program is very neat and has obviously had a lot of hard work put into it but it simply takes too long to get to the final screen that shows the information that you bought the program for. Before the letters page starts buzzing with insults thrown in my direction, I am not criticising *Biorhythms*, that is your choice, my comments are only directed at the programming.

If *Biorhythms* are your cup of tea then this program will do what you want it to. It will just do it slowly that's all.

Roy Coates

Gus goes gambling through space

Program: *Galactic Gus*
Supplier: Quickbeam
Price: £4.00

THIS review is of a standard game and, unfortunately, I did not even have the usual Quickbeam sheet that accompanies their games. When I first tried Galactic Gus I absolutely hated it. I was losing all of my eight lives within seconds of starting and felt very dejected.

Having persisted with it I am hooked on it and spend quite a lot of time trying to sort our the many problems facing Gus, the fighter pilot who is searching for fuel pods to refuel his fighter so that he can rejoin the Spaceship Dragon. He is seated on a rocket chair and has to be steered round laser doors, creatures and other suprises.

This is not a zap-em type game but one has to be very skillful to avoid the creatures on many of the 215 screens as you move through the maze trying to find fuel. The type of maze involved is not too unlike *Dark Pit*. There are also bananas and small white objects, and I have seen a key (but can't yet reach it) which must be taken to the keyhole to reach further screens.

Once you have mastered how to avoid the creatures try Invisible Land where you can see the creatures but Gus is invisible. For the hackers there is a combination to be entered to get further.

The graphics on this game are nothing special at all but for £4 you are presented with a series of challenges which will keep even the most adept busy for many hours. Not a classic game but certainly good value for money and containing a variety of problems some of which I have not even come across.

First printed in Dragon Update

Mike Stott

Dragonsoft

New software for review should be sent to *Dragon User*
12-13 Little Newport Street, London WC2H 7PP.

Valuable archaeological artefacts discovered by explorers in Delta

Program: *Toolkit & Scribe*
Supplier: Premier Microsystems
Price: No Longer Available

ALTHOUGH the demise of Premier was some time ago, I decided that other Dragon owners (in particular DeltaDOS users), should know about the excellent software that the company produced. I feel they never got the recognition they deserved at the time and this might have been a reason for their collapse. Both of these products must be used in conjunction with DeltaDOS.

TOOLKIT

This comes in the form of an EPROM fitted inside your DOS controller. I can almost hear you say "AH! But you can't buy them any more...let alone get one fitted!". Well I tried and I tried to find a supplier and almost gave up trying, but in the end I found a very helpful person who was kind enough to supply an EPROM for me AND fit it. TOOLKIT gives the user 60 extra Basic commands and functions. I have condensed a description of these below. There are 24 low-res screens available to the user also.

AUTOx,y — Gives automatic line numbering from x in increments of y
BEEP — Produces one single tone through normal sound channel
BEEP n — Produces n tones
BEEP ON — Produces a single tone every time a key is pressed
BEEP OFF — Stops the above
BLOCKx,y,a,b,z,s — Draw block, start x,y,length a,height b,character z,screen s
BREAK ON/OFF — Disable and enable the break key
CAPPEND — Append a cassette program from tape
CDIR — zproduces a fully comprehensive tape directory
CLSx,s — Fill screen s with character x
DEEK/DOKE — Double byte equivalents to PEEK & POKE
ECHOx-y,z — Copy lines x to y to line z onwards
ENCA=/ENCB= — Set enclosure characters for SEARCH & REPLACE
ERL — Returns line where an error was encountered
ERR — Returns a generated error code
ERROR n — Simulate error number n
ERROR GOTO n — Goto line number n when error occurs
ERROR OFF — Turn off all error trapping
E. — Edit last line entered
E.n — Edit line n
E, — Edit next line
E; — Edit line previous to E.
FRAMEx,y,s,b,c,s — Draw an open rectangle as per BLOCK
FREE$ — Display amount of string space remaining
GOSUB n — Variable controlled GOSUB
GOTO n — Variable controlled GOTO
HANG — Halts program until a key is pressed
HOME — Returns the cursor to top left without clearing screen
HLINx,y,a,z,s — Draw horizontal line start x,y,length a,character z,screen s
INKEY — Same as INKEY$ but returns ASCII value
INPn,A$ — Controlled input of length n, into variable A$
INP@sc,n,A$ — As INP but to specific screen location sc
KEYS$ — Auto-repeat keyboard scan — returns with character
KEY — As KEY$ but returns ASCII value of key pressed
LIMIT= — Set the delimiter character for SEARCH and REPLACE
LOOK x,y,s — PEEK at screen location x,y on screen s
LVARS — Give a list to the printer of active variables in a program
MOVE x,y — Move contents of screen x to screen y
OLD — Attempt to recover a NEWED ot crashed program
PAGE — List program in controlled chunks
PAUSE n — Cause program to pause n milliseconds
PLAN — Suite of printer commands
PROG x — Program definable keys A-H (shifted)
PROG I — Define printer header
PRUNE — Removes all statements following a REM or '
RDATA x,A$ — Read x items of DATA into A$
REPLACE'x','y' — Replace x with y in program at users descretion
REPLACE'x';'y' — As above but does all occurences without asking
RESUME — Resume program from error statement
RESUME NEXT — Resume program from statement after error
RESUME GOTO n — Resume program at line n
SEARCH 'x' — Search for all occurences of x in a program
SET x,y,z,s — Fill single column/row address x,y with character z, screen s
SWOP x,y — Swop contents of screens x and y
TRACE ON/OFF — Same as TRON except output goes to top right of screen
VARS — Displays a list of active variables in a program
VLIN x,y,a,z,s — Draw a vertical line start x,y, height a,character z,screen s
WILD= — Set wild card character for SEARCH function

As you can see, this is an excellent utility and you might be surprised to know that the above list is not the end of the story! TOOLKIT also provides a Screen Editor, which can be used on its own or with the Dragons line editor. If anyone has used a BBC micro, they'll know what type of editor this is. Basically you use certain keys to move a cursor around and another key to copy everything that falls under the cursor. The difference here is that you can put text onto a temporary screen, edit it without disturbing your main listing and then return to the first screen. BRILLIANT!

SCRIBE

This is quite simply a hi-res text generator. The difference is that it fully interacts with the Dragon basic/DeltaDOS, in other words you can write your programs using it. It is supplied on disc and therefore it is bootable. By using control codes, you can perform special tasks such as selecting inverse characters and changing the colour set. the screen area is increased to 42 x 24 character density and again fully interfaces with BASIC, although you cannot poke characters to the text screen as is usual with programs of this type. A very useful feature has been added to allow you to generate new characters from within a program...the PRINT! command. The character set also inlcudes quite a few graphics characters such as playing card symbols etc. and it can be saved for later retrieval. Another new command is the PUT@ command, allowing you to precision place characters on the graphics screen. This is extremely useful when dealing with subscripts and superscripts.

The only failing of this software is that it does not fully interface with TOOLKIT. You cannot use the INP@ command or the TOOLKIT Editor whilst running SCRIBE. This is because the screen locations are not translated. It should be possible for a competent programmer to modify these problems though.

I hope that this reveiw gets published and that it is of some interest. I hold a personal opinion that DeltaDOS users have been given a raw deal in the past in regards to printed matter and hopefully this will redress the balance slightly.

Oh yes, I nearly forgot...I award TOOLKIT five Dragons AND SCRIBE four Dragons (only 4 because it does not interface with TOOLKIT).

D. Martin

Toolkit:

🐉🐉🐉🐉🐉

Scribe:

🐉🐉🐉🐉

Auto Boot

Julian Osbourne outruns the BT Error in Basic or M/C.

ACCORDING to pages 22 and 27 of the DragonDOS manual the BOOT command is provided for 'loading other operating systems from disc' and it goes on (in no great depth) to say that the system is loaded into memory at address 9728 (decimal) and executed from address 9730 (decimal). Great. So what actually happens when you type BOOT with a normal disc in the drive?? Answer : a BT Error (code 142).

Nothing about the BOOT command (or the BT error) is covered in any detail in any of the general reference books such as *Inside the Dragon* or *Anatomy of the Dragon*, in fact the only time BOOT is mentioned is to say that its BASIC token is $D1 and the BOOT despatch address is at $DADC which, if you are anything like me, means nothing at all!

The object of this article is to show how to use the BOOT command on your own discs to simplify the running of your most often used programs, so here goes...

When it is called the BOOT routine in DragonDOS reads sector 3 of track 0 on the current drive (address $EB, default = drive 1). If the first two bytes of this sector are the ascii codes for OS ($4F and $53 respectively) then 4K of code is loaded from disc into address 9728 (decimal) starting with sector 3 of track 0. When this code has been loaded it is executed from address 9730 (decimal).

The program given in this article uses the BOOT routine to implement an auto-run facility for a given program (MENU.BAS in this example) so that on typing BOOT the named program is loaded and run with no further action needed.

The assembly listing is in three distinct pieces:

1) The ascii codes for OS at placed at $2600 (9728 decimal)
2) The code to run 'MENU.BAS' when executed
3) The routine to save the above code to sector 3, track 0 (My thanks to Brian Cadge for supplying the code for part 2 in his *Dragon Answers* column for August 1985).

The 'save to disc' part of the routine works as follows:

To save a sector (256 bytes long) to disc, location 235 (decimal) is set to the drive number, locations 236 and 237 (decimal) are set to the track and sector where the data is to be saved to and locations 238 and 239 (decimal) are set to the address in memory where data is to be saved from. The disc write routine at 49409 (decimal) is then called to save a sector at a time until the end of track 0 (which is approximately 4k of code) when the routine returns to BASIC.

On entering this program (by assembler or by machine code loader) save it to disc with:

SAVE"BOOT.BIN",&H2600,&H2637,&H2615

Now insert a blank disc into the drive and run the routine with

EXEC &H2615

The routine will then save the auto-run part of the program to disc (eg from address 9728 onwards) at track 0, sector 3 and return to BASIC. Now save onto this disc the program that you require the BOOT to operate on (eg the program MENU.BAS in this example) and then type BOOT. The program will then load and auto-run itself.

The routine given will auto-run BASIC or machine code programs by just changing the filename given in the FCC statement so you could use it to load *Moon Cresta* or *Bean Stalker* just as easily as using it to run a menu program for your utilities disc.

I am willing to attempt to answer any queries regarding the use of the BOOT program that may arise during its use. My address is 8 Helston Road, Nailsea, Bristol, BS19 2UA, or messages can be left in my Prestel Mailbox 272853381.

```
        ORG   9728
START   FCC   /OS/     BOOT FLAG
*******************************
*THE PROGRAM BELOW WILL BE RUN *
*WHENEVER BOOT IS TYPED        *
*******************************
        LDX   £FNAME
        STX   166
        JMP   $D4A4
FNAME   FCC   34,/MENU.BAS/,34,0
*******************************
*THE NEXT PART OF THE PROGRAM  *
*SAVES THE ABOVE BOOT PROGRAM  *
*TO DISK AT TRACK 0,SECTOR 3    *
*******************************
@START CLRA
        CLR   236      TRACK £
        LDA   £3
        STA   237      SECTOR £
        LDX   £9728    START ADRS
SAVE    PSHS  X
        STX   238      BUFFER ADR
        JSR   49409    WRITE DISK
        PULS  X
        LEAX  256,X
        INC   237
        LDA   237
        CMPA  £19
        BLO   SAVE
        JMP   33649    GOTO BASIC
```

```
2600 2600            ORG   9728
2600 4F53       START   FCC   /OS/     BOOT FLAG
2602            *******************************
2602            *THE PROGRAM BELOW WILL BE RUN *
2602            *WHENEVER BOOT IS TYPED        *
2602            *******************************
2602 8E260A          LDX   £FNAME
2605 9FA6            STX   166
2607 7ED4A4          JMP   $D4A4
260A 224D454E55 FNAME   FCC   34,/MENU.BAS/,34,0
2615            *******************************
2615            *THE NEXT PART OF THE PROGRAM  *
```

```
2615                    *SAVES THE ABOVE BOOT PROGRAM  *
2615                    *TO DISK AT TRACK 0,SECTOR 3   *
2615                    ********************************
2615 4F                 @START CLRA
2616 0FEC                      CLR    236      TRACK £
2618 8603                      LDA    £3
261A 97ED                      STA    237      SECTOR £
261C 8E2600                    LDX    £9728    START ADRS
261F 3410               SAVE   PSHS   X
2621 9FEE                      STX    238      BUFFER ADR
2623 BDC101                    JSR    49409    WRITE DISK
2626 3510                      PULS   X
2628 30890100                  LEAX   256,X
262C 0CED                      INC    237
262E 96ED                      LDA    237
2630 8113                      CMPA   £19
2632 25EB                      BLO    SAVE
2634 7E8371                    JMP    33649    GOTO BASIC
2637
2637
```

```
>D $2600,$2637
2600 4F 53 8E 26     O  S  .  &
2604 0A 9F A6 7E     .  .  .  .
2608 D4 A4 22 4D     .  .  "  M
260C 45 4E 55 2E     E  N  U  .
2610 42 41 53 22     B  A  S  "
2614 00 4F 0F EC     .  O  .  .
2618 86 03 97 ED     .  .  .  .
261C 8E 26 00 34     .  &  .  4
2620 10 9F EE BD     .  .  .  .
2624 C1 01 35 10     .  .  5  .
2628 30 89 01 00     0  .  .  .
262C 0C ED 96 ED     .  .  .  .
2630 81 13 25 EB     .  .  %  .
2634 7E 83 71 39     .  .  q  9
>



U $2600,$2637
2600 4F          CLRA
2601 53          COMB
2602 8E260A      LDX    £$260A
2605 9FA6        STX    <$A6
2607 7ED4A4      JMP    $D4A4
```

```
260A 224D        BHI    $2659
260C 45                          E
260D 4E                          N
260E 55                          U
260F 2E42        BGT    $2653
2611 41                          A
2612 53          COMB
2613 2200        BHI    $2615
2615 4F          CLRA
2616 0FEC        CLR    <$EC
2618 8603        LDA    £$03
261A 97ED        STA    <$ED
261C 8E2600      LDX    £$2600
261F 3410        PSHS   X
2621 9FEE        STX    <$EE
2623 BDC101      JSR    $C101
2626 3510        PULS   X
2628 30890100    LEAX   $0100,X
262C 0CED        INC    <$ED
262E 96ED        LDA    <$ED
2630 8113        CMPA   £$13
2632 25EB        BCS    $261F
2634 7E8371      JMP    $8371
2637 39          RTS
>0
```

```
10 A=&H2600
20 READ A$
30 IF A$="**" THEN END
40 POKE A,VAL("&H"+A$)
50 A=A+1:GOTO20
60 DATA 4F,53,8E,26,0A,9F,A6,7E,D4,A4,22,4D
70 DATA 45,4E,55,2E,42,41,53,22,00,4F,0F,EC
80 DATA 86,03,97,ED,8E,26,00,34,10,9F,EE,BD
90 DATA C1,01,35,10,30,89,01,00,0C,ED,96,ED
100 DATA 81,13,25,EB,7E,83,71,39,**
```

Two extra commands

***R. G. Whittaker** inverts his text and scrolls it to the right*

THIS article shows one of many ways to add new commands to Dragon Basic. It uses the fact that each time the Dragon reads a statement, it jumps to location 377. Normally this contains code 57 which is an RTS instruction, and so the processor returns to where it was, but if we store code 126 (JMP instruction) in this location and then load location 378 with the address of a new routine we can cause the processor to access our routine every time it reads a statement.

Using this we can write a routine to check if our new command has been typed in and then execute a new routine to perform this command's function. This could be a routine to, for example, scroll the screen or execute an autorepeat function. The two commands I have added are REV, which inverts the text screen, and SCR, which scrolls the text screen to the right one character space.

First of all the program stores code 126 in location 377 and the start address of the program in 378. Then it returns to basic. When the routine START is executed, it checks the 'A' register to see if it is within the required range 65 ('A') to 90 ('Z'). Then it checks if this is the first letter of the new command ('R') and if not it jumps to another routine to check for the second command, otherwise it checks the rest of the letters in the command using the locations pointed to by location 166 which hold the rest of the letters in statement.

If the command is correct, the routine checks the next character to see if this is valid. Usually the only characters one has after commands are colons or spaces (except for input, paint etc) and so these are checked for. If the character is an equals sign, the processor would return to basic and allow you to use REV or SCR as a variable (IE SCR=10) and so if an equals sign or any other character is found, the routine loads the 'B' register with 2 and jumps to the ROM routine at 33604 which gives a syntax error.

To enter the new commands, type in the loader and enter the codes line by line when asked then save the routine as instructed. Alternatively, type in the assembly listing. The routines are easy to change and so you should be able to add different commands to your Dragon Basic.

Listing 1

```
32000  8E7D0CBF017A867EB701
32010  7939815A223C81412538
32020  815227037E7D4D9EA6E6
32030  01C14527037E7D4CE602
32040  C15627037E7D4CE603C1
32050  3A2707C12125037E7D91
32060  8E0400A6848840A7808C
32070  060025F5868639815327
32080  037E7D4C9EA6E601C143
32090  27037E7D4CE602C15227
32100  037E7D4CE603C13A2707
32110  C12125037E7D918E0600
32120  E6823404C61FA682A701
32130  5A26F93504E7848C0400
32140  22EA868639C602BD8344
```

Listing 2

```
10 CLS
20 CLEAR200,31999:AD=32000:CS=0
30 PRINT" ENTER LINE OF HEX ('XX' TO END)"
40 PRINTAD;:INPUTH$
50 FORK=1TOLEN(H$)STEP2
60 M$=MID$(H$,K,2):IFM$="XX"THEN100
70 V=VAL("&H"+M$):POKEAD,V:CS=CS+V
80 AD=AD+1:NEXTK
90 GOTO40
100 CLS
110 IFCS<>14558THENPRINT"DATA ERROR TRY AGAIN":END
120 PRINT@224,"  PRESS ANY KEYTO SAVE CODE :-"
130 A$=INKEY$:IFA$=""THEN130
140 CSAVEM"COMMANDS",32000,32150,32000
```

Listing 3

```
*A

 :RUN

0800    ORG $7D00

7D00 8E 7D 0C   INIT LDX #START
```

```
7D03 BF 01 7A     STX 378

7D06 86 7E        LDA #126

7D08 B7 01 79     STA 377

7D0B 39           RTS
```

```
7D0C 81 5A     START CMPA #90
7D0E 22 3C           BHI END
7D10 81 41           CMPA #65
7D12 25 38           BLO END
7D14 81 52           CMPA #82
7D16 27 03           BEQ PASS
7D18 7E 7D 4D        JMP SCR
7D1B 9E A6      PASS LDX 166
7D1D E6 01           LDB 1,X
7D1F C1 45           CMPB #69
7D21 27 03           BEQ PASS1
7D23 7E 7D 4C        JMP END
7D26 E6 02     PASS1 LDB 2,X
7D28 C1 56           CMPB #86
7D2A 27 03           BEQ PASS2
7D2C 7E 7D 4C        JMP END
7D2F E6 03     PASS2 LDB 3,X
7D31 C1 3A           CMPR #58
7D33 27 07           BEQ COMM
7D35 C1 21           CMPB #33
7D37 25 03           BLO COMM
7D39 7E 7D 91        JMP ERR
7D3C 8E 04 00   COMM LDX #1024
7D3F A6 84      LOOP LDA ,X
7D41 88 40           EORA #$40
7D43 A7 80           STA ,X+
7D45 8C 06 00        CMPX #1536
7D48 25 F5           BLO LOOP
7D4A 86 86           LDA #134
7D4C 39          END RTS
7D4D 81 53       SCR CMPA #83
7D4F 27 03           BEQ SCR1
```

```
7D51 7E 7D 4C        JMP END
7D54 9E A6      SCR1 LDX 166
7D56 E6 01           LDB 1,X
7D58 C1 43           CMPB #67
7D5A 27 03           BEQ SCR2
7D5C 7E 7D 4C        JMP END
7D5F E6 02      SCR2 LDB 2,X
7D61 C1 52           CMPB #82
7D63 27 03           BEQ SCR3
7D65 7E 7D 4C        JMP END
7D68 E6 03      SCR3 LDB 3,X
7D6A C1 3A           CMPB #58
7D6C 27 07           BEQ COMM2
7D6E C1 21           CMPB #33
7D70 25 03           BLO COMM2
7D72 7E 7D 91        JMP ERR
7D75 8E 06 00  COMM2 LDX #1536
7D78 E6 82     LOOP2 LDB ,-X
7D7A 34 04           PSHS B
7D7C C6 1F           LDB #31
7D7E A6 82     LOOP3 LDA ,-X
7D80 A7 01           STA 1,X
7D82 5A              DECB
7D83 26 F9           BNE LOOP3
7D85 35 04           PULS B
7D87 E7 84           STB ,X
7D89 8C 04 00        CMPX #1024
7D8C 22 EA           BHI LOOP2
7D8E 86 86           LDA #134
7D90 39              RTS
7D91 C6 02       ERR LDB #2
7D93 BD 83 44        JSR 33604
```

Scopy for SuperDos

Martyn Armitage remembers his youth and the horrors of swapping discs around.

RECENTLY a member of our Dragon Club upgraded his Cumana Dos V.2.0 to Grosvenor SuperDos. One of his regrets was the loss of the SCOPY command that the Cumana Dos provides.

He asked if it was possible for me to write a utility that would replace this lost piece of soft/firmware, and so being the knight in shining armour that I am, and always willing to accept a challenge, I took up the gauntlet. The result of my efforts follow.

The function of the SCOPY command, for those who are strangers to the Cumana Dos, is to enable the user to copy a file from one disc to another, using one disc drive. How I shudder when thinking back to my 'one drive' days and the pain and effort involved in copying files from disc to disc, especially with .DATA files. The program that follows will remove all the frustrations of the one drive owner (well, perhaps I exaggerate, one of them).

Listing 1 (the assembler source code) was written using the DSKDREAM package from Grosvenor. Owners of other assemblers should have very little or no difficulty in converting it to their own assembler format. For those of you without an assembler the BASIC program in **listing 2** will install the machine code ready for saving the disc. In both cases the resultant code will only run on the Eurohard and SuperDos DOSs. If you want to run the program on the original Dragon Dos V.1.0 then, in the assembler source code don't include the V40x equates and replace all the references to them with the V10x version, ie, for V402 use V102, etc. If you are assembling other than for the V.1 Dos then the V10x equates can be left out.

If you are using the basic listing to install the code then you will notice that some DATA statements, as well as having a number, have a second number following it in brackets, ie, line 140 has as one of the pieces of data: D1(D4). If you are wanting to produce the version for Eurohard/SuperDos then use the first number and ignore the number in brackets. If you are wanting to produce the version for DragonDos 1 then ignore the first number and use the number in brackets.

To use the program is simplicity itself. Before loading with a CLEAR200, &H7EDO, the program can be summoned to your aid by the use of the following:

EXEC&H7ED1:'fnamel.ext' TO 'fname 2.ext' ⟨ENTER⟩

Once this is entered a check is made to see if there is sufficient free memory for the utility to operate, if there is less than 256 bytes the command will be aborted with an OM error. If there is sufficient memory the screen will be cleared and the message:

INSERT SOURCE
PRESS ANY KEY

will be printed. Once these instructions have been carried out, the screen will clear and the message:

READING SOURCE

will be displayed. The disc is then checked to see if the file exists, if it doesn't then don't be too surprised to get a NE error. If the file does exist then the screen will clear again and the next prompt:

INSERT DESTINATION
PRESS ANY KEY

will be displayed. After carrying out these instructions the screen will, for an instant, while the file is created on the destination disc, display the messge:

WRITING DESTINATION

The screen will then clear again and redisplay the INSERT SOURCE, PRESS ANY KEY message. The program will then proceed to read as much of the file into memory as will fit. When memory is full, or all the file has been read you will be prompted to change the disc, etc. This prompting for disc changes will continue until the whole file has been transferred. All this disc swapping may sound a bind, but you will find that, providing there is no program in memory (apart from SCOPY) then most files will be copied in two or three disc changes. When copying very large files the number of disc changes can be reduced by ensuring that the only program in memory is the SCOPY one, and by issuing a PLCLEAR 1 command before use, the result being that as much memory as is available will be claimed by the utility.

When copying a file it is most important that the two file names differ in some respect, ie, PROG1, PROG2 and that the extensions are included. if the names are identical then the file will not be copied. Changing the extension will suffice as the required difference. The utility will copy a file to the same disc, prompting for disc changes, which should be ignored, but using it to do so would be a waste of time as the COPY command of the Dos will do it without the prompts.

Listing 1. Assembler Source Code

```
* Written in Position Independant Code
* So the resultant code can be easily
* relocated.
          ORG     $7ED1
          PUT     $4ED1
****************************************
*  SCOPY FOR DRAGON/EUROHARD/SUPER DOS  *
*         WRITTEN USING DSKDREAM        *
*          BY: MARTYN ARMITAGE          *
*                01/08/87               *
****************************************
CREATE    EQU     $C00C
LENFIL    EQU     $C00E
CLOSAL    EQU     $C010
READFL    EQU     $C014
WRITFL    EQU     $C016
BACKDR    EQU     $C024

****************************************
*  USE V10x EQUATES FOR DRAGON DOS 1    *
****************************************
V101      EQU     $D6D4
V102      EQU     $C69E
V103      EQU     $CEAC
V104      EQU     $DF54
V105      EQU     $DF63
```

```
V106        EQU    $DF77
*************************************
*          USE V40x EQUATES FOR      *
*        EUROHARD AND SUPERDOS       *
*************************************
V401        EQU    $D6D1
V402        EQU    $C6C5
V403        EQU    $CED2
V404        EQU    $DF5A
V405        EQU    $DF6D
V406        EQU    $DF86
*************************************
7ED1  9D9F         SCOPY     JSR   <$9F
7ED3  AD9FC010               JSR  (CLOSAL)
7ED7  2643                   BNE   PASERR
7ED9  1700BC                 LBSR  SOURCE
7EDC  3279                   LEAS  -7,S
7EDE  1F40                   TFR   S,D
7EE0  830100                 SUBD  #$0100
7EE3  931F                   SUBD  <$1F
7EE5  2B04                   BMI   OMERR
7EE7  5F                     CLRB
7EE8  4D                     TSTA
7EE9  2603                   BNE   NOERR
7EEB  7E8342       OMERR     JMP   $8342
7EEE  ED62         NOERR     STD   2,S
7EF0  BDD6D1                 JSR   V401   ;** V101 **
7EF3  2627                   BNE   PASERR
7EF5  A7E4                   STA   ,S
7EF7  AD9FC00E               JSR   (LENFIL)
7EFB  261F                   BNE   PASERR
7EFD  1700AA                 LBSR  DESTIN
7F00  9DA5                   JSR   <$A5
7F02  81BC                   CMPA  #$BC   ;TO ?
7F04  2703                   BEQ   NOERR1
7F06  7E89B4                 JMP   $89B4
7F09  9D9F         NOERR1    JSR   <$9F
7F0B  BDD6D1                 JSR   V401   ;** V101 **
7F0E  2704                   BEQ   NOERR2
7F10  C1A0                   CMPB  #$A0   ;NE ERROR ?
7F12  2608                   BNE   PASERR
7F14  A761         NOERR2    STA   1,S
7F16  AD9FC00C               JSR   (CREATE)
7F1A  2703                   BEQ   MORE
7F1C  7EC6C5       PASERR    JMP   V402   ;** V102 **
7F1F  AD9FC024     MORE      JSR   (BACKDR)
7F23  A6E4                   LDA   ,S
7F25  97F1                   STA   <$F1
7F27  BDCED2                 JSR   V403   ;** V103 **
7F2A  EC0C                   LDD   12,X
7F2C  10A38810               CMPD  16,X
7F30  2507                   BCS   NOCHEK
7F32  A60E                   LDA   14,X
7F34  A18812                 CMPA  18,X
7F37  2756                   BEQ   NOMORE
7F39  EE0C         NOCHEK    LDU   12,X
7F3B  A60E                   LDA   14,X
7F3D  A766                   STA   6,S
7F3F  EF64                   STU   4,S
7F41  EC62                   LDD   2,S
7F43  E365                   ADD   5,S
7F45  ED65                   STD   5,S
```

```
7F47  2402                     BCC     NOINC
7F49  6C64                     INC     4,S
7F4B  A664      NOINC          LDA     4,S
7F4D  A08810                   SUBA    16,X
7F50  250E                     BCS     HERE1
7F52  EC65                     LDD     5,S
7F54  A38811                   SUBD    17,X
7F57  2307                     BLS     HERE1
7F59  EC8811                   LDD     17,X
7F5C  A30D                     SUBD    13,X
7F5E  ED62                     STD     2,S
7F60  8D36      HERE1          BSR     SOURCE
7F62  A6E4                     LDA     ,S
7F64  EE0C                     LDU     12,X
7F66  E60E                     LDB     14,X
7F68  10AE62                   LDY     2,S
7F6B  9E1F                     LDX     <$1F
7F6D  AD9FC014                 JSR     (READFL)
7F71  26A9                     BNE     PASERR
7F73  8D35                     BSR     DESTIN
7F75  A661                     LDA     1,S
7F77  97F1                     STA     <$F1
7F79  BDCED2                   JSR     V403    ;** V103 **
7F7C  10AE8810                 LDY     16,X
7F80  E68812                   LDB     18,X
7F83  EE62                     LDU     2,S
7F85  9E1F                     LDX     <$1F
7F87  AD9FC016                 JSR     (WRITFL)
7F8B  268F                     BNE     PASERR
7F8D  2090                     BRA     MORE
7F8F  AD9FC010  NOMORE         JSR     (CLOSAL)
7F93  2687                     BNE     PASERR
7F95  3267                     LEAS    7,S
7F97  39                       RTS
7F98  3476      SOURCE         PSHS    D,X,Y,U
7F9A  BDBA77                   JSR     $BA77
7F9D  8EDF5A                   LDX     #V404  ;** V104 **
7FA0  BD90E5                   JSR     $90E5
7FA3  8D1A                     BSR     KEY
7FA5  308C23                   LEAX    READ-1,PCR
7FA8  2010                     BRA     RETURN
7FAA  3476      DESTIN         PSHS    D,X,Y,U
7FAC  BDBA77                   JSR     $BA77
7FAF  8EDF6D                   LDX     #V405  ;** V105 **
7FB2  BD90E5                   JSR     $90E5
7FB5  8D08                     BSR     KEY
7FB7  308C20                   LEAX    WRITE-1,PCR
7FBA  BD90E5    RETURN         JSR     $90E5
7FBD  35F6                     PULS    D,X,Y,U,PC
7FBF  8EDF86    KEY            LDX     #V406  ;** V106 **
7FC2  BD90E5                   JSR     $90E5
7FC5  BDB505                   JSR     $B505
7FC8  BDBA77                   JSR     $BA77
7FCB  39                       RTS
7FCC  52454144  READ           FCC     /READ/
7FD0  494E4720                 FCC     /ING /
7FD4  534F5552                 FCC     /SOUR/
7FD8  434500                   FCC     /CE/,0
7FDB  57524954  WRITE          FCC     /WRIT/
7FDF  494E4720                 FCC     /ING /
7FE3  44455354                 FCC     /DEST/
7FE7  494E4154                 FCC     /INAT/
```

```
7FEB  494F4E00          FCC      /ION/,0

      ;WHEN THE PROGRAM HAS BEEN ASSEMBLED SAVE IT TO
      ;DISK WITH  SAVE"SCOPY",&H4ED1,&H4FEF,&H4ED1 THEN
      ;ENTER CLEAR200,&H7ED0:LOAD"SCOPY.BIN",&H7ED1
      ;ONCE LOADED RESAVE TO DISK WITH
      ;SAVE"SCOPY",&H7ED1,&H7FEF,&H7ED1
      ;THE PROGRAM CAN THEN SUBSEQUENTLY BE RELOADED
      ;WITHOUT HAVING TO USE AN OFFSET TO RELOCATE IT.
    0 REM *USERS OF DRAGON DOS V.1. USE THE
    1 REM *NUMBERS IN BRACKETS INSTEAD OF THE
    2 REM *NUMBER IMMEDIATELY BEFORE IT
    3 REM *IE... DATA 4E(42) USE 42 INTEAD OF 4E
    4 REM *USERS OF OTHER DOS'S IGNORE THE NUMBERS
    5 REM *IN BRACKETS...
    6 REM ***************************************
    7 REM * SCOPY FOR DRAGON/EUROHARD/SUPER/DOS *
    8 REM *   BY MARTYN ARMITAGE 01/08/1987     *
    9 REM ***************************************
   10 CLEAR 200,&H7ED0:CLS:PRINT"INSTALLING SCOPY"
   20 FOR I = &H7ED1 TO &H7FEF
   30 READ A$:A=VAL("&H"+A$)
   40 POKE I,A:CS=CS+A
   50 NEXT
   60 IF CS<>32404(32264) THEN PRINT "ERROR IN DATA":END
   70 CLS:PRINT"SCOPY INSTALLED.":PRINT"START ADDRESS &H7ED1"
   80 PRINT"  END ADDRESS &H7FEF"
   90 PRINT" EXEC ADDRESS &H7ED1"
   100 PRINT"REMEMBER TO SAVE IT!":END
   110 DATA 9D,9F,AD,9F,C0,10,26,43,17,00
   120 DATA BC,32,79,1F,40,83,01,00,93,1F
   130 DATA 2B,04,5F,4D,26,03,7E,83,42,ED
   140 DATA 62,BD,D6,D1(D4),26,27,A7,E4
   150 DATA AD,9F,C0,0E,26,1F,17,00,AA,9D
   160 DATA A5,81,BC,27,03,7E,89,B4,9D,9F
   170 DATA BD,D6,D1(D4),27,04,C1,A0,26
   180 DATA 08,A7,61,AD,9F,C0,0C,27,03,7E
   190 DATA C6,C5(9E),AD,9F,C0,24,A6,E4
   200 DATA 97,F1,BD,CE,D2(AC),EC,0C,10
   210 DATA A3,88,10,25,07,A6,0E,A1,88,12
   220 DATA 27,56,EE,0C,A6,0E,A7,66,EF,64
   230 DATA EC,62,E3,65,ED,65,24,02,6C,64
   240 DATA A6,64,A0,88,10,25,0E,EC,65,A3
   250 DATA 88,11,23,07,EC,88,11,A3,0D,ED
   260 DATA 62,8D,36,A6,E4,EE,0C,E6,0E,10
   270 DATA AE,62,9E,1F,AD,9F,C0,14,26,A9
   280 DATA 8D,35,A6,61,97,F1,BD,CE,D2(AC)
   290 DATA 10,AE,88,10,E6,88,12,EE,62,9E
   300 DATA 1F,AD,9F,C0,16,26,8F,20,90,AD
   310 DATA 9F,C0,10,26,87,32,67,39,34,76
   320 DATA BD,BA,77,8E,DF,5A(54),BD,90
   330 DATA E5,8D,1A,30,8C,23,20,10,34,76
   340 DATA BD,BA,77,8E,DF,6D(63),BD,90
   350 DATA E5,8D,08,30,8C,20,BD,90,E5,35
   360 DATA F6,8E,DF,86(77),BD,90,E5,BD
   370 DATA B5,05,BD,BA,77,39,52,45,41,44
   380 DATA 49,4E,47,20,53,4F,55,52,43,45
   390 DATA 00,57,52,49,54,49,4E,47,20,44
   400 DATA 45,53,54,49,4E,41,54,49,4F,4E
   410 DATA 00,00,00,00,00,00,00,00,00,00
```

Down in the dumps

Dragon User frequently gets requests for screen dumps. Here we present some specimens from our collection

IN previous issues of *Dragon User* routines have been given for graphics dumps to a variety of printers. One type that has been omitted is a Tandy dot matrix printer. The programs described in this article have been designed for and used on a Tandy DMP 110 printer which is capable of operating in a 16-dot addressable high resolution graphics mode. The small size dump (**listing 1**) is compatible with all 2-colour graphics modes on the Dragon and gives a printout with the correct orientation. Because of size limitations a dump of double size needs to be done sideways. **Listing 2** gives a program which will operate in PMODE 4.1 only. Both programs are written in position independent code and can be located anywhere in memory.

In use both programs require the pmode, foreground and background colours to be set. Once this information is available a dump is performed with the current foreground colour as black. A full list of both Dragon and printer codes used by the programs is given in **table 1**. Output to the printer is by a JSR instruction to the ROM location &H 800F with the code to be output in the 'A' register.

The mode of information storage used by the Dragon in its graphics screen memory requires special techniques to be adopted if dumps are to be performed in the correct orientation. This is achieved in **listing 1** by the use of a buffer store. Prior to the testing of the screen memory the particular PMODE in use is examined and tested for validity. If an invalid PMODE (1 or 3) is in use no printer output is made and an immediate return is made to the calling program. Once the PMODE in use has been determined appropriate pin firing patterns are stored in the locations PPAT1 to PPAT4. The screen start location and the number of bytes in each row are then determined. Once these parameters have been set up the screen memory is scanned row by row and appropriate pin firing patters for each bit loaded into the buffer. When four rows (two for PMODE 0) have been examined the printer is initialised and the contents of the store output to the printer.

The double size dump (**listing 2**) presents an alternative approach to the problem of unravelling screen memory. In this case the screen memory is examined column by column. The contents of each byte are manipulated between the 'A', 'B' registers and a temporary store prior to being out put to the printer; in this mode each column is examined twice.

The approaches to screen dumping outlined in this article can be extended to give either a double density dump, a double size horizantal partial dump or a small sideways dump. **Listings 1 and 2** have been produced using Dskdream although the hex codes given in column 2 could always be entered using one of the many Hex Loaders that have appeared in these pages. Assuming that one of the programs has been loaded at the default location of &H 7C00 (the memory requirement is &H 400 bytes) it can be called by EXEC &H 7C00.

Richard Hatton

TABLE 1 (All Numbers in HEX)

Dragon Parameters

800F	Output of code to printer
B2	Foregroung colour
B6	PMODE
B9	Number of Bytes in row
B7	Bottom of graphics screen
BA	Top of graphics screen

Printer Parameters

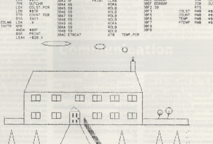
1B 47	8/120 line feed
1B 10,x,x	position print head
1B 49,x,x	send high resolution graphics data
1A	carriage return/no line feed
1E	end graphics mode

```
3001                    *       LISTING 1
3001                    *
3001                    * COPYRIGHT J.R.HATTON
3001                    *       SEPTEMBER 1985
3001  800F      OUTCHR  EQU     #$800F
3001 3436               PSHS    A,B,X,Y
3003 D6B2               LDB     $B2
3005 C100               CMPB    #00
3007 2708               BEQ     BLK
3009 C643               LDB     #$43
300B E78D00B9           STB     COL,PCR
300F 2006               BRA     ST
3011 C612       BLK     LDB     #$12
3013 E78D00B1           STB     COL,PCR
3017 9EBA       ST      LDX     $BA
3019 8D25               BSR     PMODE
301B E68D01A3           LDB     EROR,PCR
301F C176               CMPB    #$76
3021 2601               BNE     CONT
3023 39                 RTS
3024 8D66       CONT    BSR     CLEAR
3026 318D019A           LEAY    STORE,PCR
302A 10AF8D0189         STY     STOST,PCR
302F 8D71               BSR     GETSQ
3031 170100             LBSR    PRINT
3034 9CB7               CMPX    $B7
3036 26EC               BNE     CONT
3038 861E               LDA     #$1E
303A BD800F             JSR     OUTCHR
303D 3536               PULS    Y,X,A,B
303F 39                 RTS
3040 D6B6       PMODE   LDB     $B6
3042 8602               LDA     #2
3044 A78D0174           STA     PASNO,PCR
3048 A78D0171           STA     ROWNO,PCR
304C C100               CMPB    #00
304E 260D               BNE     PM2
3050 860A               LDA     #10
3052 A78D0168           STA     PPAT1,PCR
3056 86A0               LDA     #160
3058 A78D0163           STA     PPAT2,PCR
305C 39                 RTS
305D 8602       PM2     LDA     #2
305F A78D015B           STA     PPAT1,PCR
3063 8604               LDA     #4
3065 A78D0154           STA     ROWNO,PCR
3069 8608               LDA     #8
306B A78D0150           STA     PPAT2,PCR
306F 8620               LDA     #32
3071 A78D0148           STA     PPAT3,PCR
3075 8680               LDA     #128
3077 A78D0145           STA     PPAT4,PCR
307B C102               CMPB    #2
307D 2601               BNE     PM4
307F 39                 RTS
3080 C104       PM4     CMPB    #4
3082 2601               BNE     ERR
3084 39                 RTS
3085 8676       ERR     LDA     #$76
3087 A78D0137           STA     EROR,PCR
308B 39                 RTS
308C 318D0334   CLEAR   LEAY    STOEND,PCR
3090 3420               PSHS    Y
3092 318D012E           LEAY    STORE,PCR
3096 4F                 CLRA
3097 5F                 CLRB
3098 EDA1       CL      STD     ,Y++
309A 10ACE4             CMPY    ,S
309D 26F9               BNE     CL
309F 3262               LEAS    2,S
30A1 39                 RTS
30A2 E68D0116   GETSQ   LDB     PASNO,PCR
30A6 E78D010B           STB     PASCNT,PCR
30AA 318D0110   PASS    LEAY    PPAT1,PCR
30AE 10AF8D0107         STY     PATNO,PCR
30B3 E68D0106           LDB     ROWNO,PCR
30B7 E78D00FB           STB     ROWCNT,PCR
30BB D6B9       ROW     LDB     $B9
30BD E78D00F6           STB     BYTCNT,PCR
30C1 10AE8D00F2         LDY     STOST,PCR
30C6 A680       BYTE    LDA     ,X+
30C8            COL     RMB     #1
30C9 8580               BITA    #$80
30CB 8D59               BSR     STOBIT
30CD 8540               BITA    #$40
30CF 8D55               BSR     STOBIT
30D1 8520               BITA    #$20
30D3 8D51               BSR     STOBIT
30D5 8510               BITA    #$10
30D7 8D4D               BSR     STOBIT
30D9 8508               BITA    #$08
30DB 8D49               BSR     STOBIT
30DD 8504               BITA    #$04
30DF 8D45               BSR     STOBIT
30E1 8502               BITA    #$02
30E3 8D41               BSR     STOBIT
30E5 8501               BITA    #$01
30E7 8D3D               BSR     STOBIT
30E9 6A8D00CA           DEC     BYTCNT,PCR
30ED E68D00C6           LDB     BYTCNT,PCR
30F1 C100               CMPB    #00
30F3 26D1               BNE     BYTE
30F5 6A8D00BD           DEC     ROWCNT,PCR
30F9 10AE8D00BC         LDY     PATNO,PCR
30FE 3121               LEAY    1,Y
3100 10AF8D00B5         STY     PATNO,PCR
3105 E68D00AD           LDB     ROWCNT,PCR
3109 C100               CMPB    #00
310B 26AE               BNE     ROW
310D 6A8D00A4           DEC     PASCNT,PCR
3111 10AE8D00A2         LDY     STOST,PCR
3116 3121               LEAY    1,Y
3118 10AF8D009B         STY     STOST,PCR
311D E68D0094           LDB     PASCNT,PCR
3121 C100               CMPB    #00
3123 2685               BNE     PASS
3125 39                 RTS
3126 2703       STOBIT  BEQ     SET
3128 3122               LEAY    2,Y
312A 39                 RTS
312B E69D000B   SET     LDB     (PATNO,PCR)
312F EBA4               ADDB    ,Y
3131 E7A1               STB     ,Y++
3133 39                 RTS
3134 861B       PRINT   LDA     #$1B
3136 BD800F             JSR     OUTCHR
3139 8647               LDA     #$47
313B BD800F             JSR     OUTCHR
313E 861B               LDA     #$1B
3140 BD800F             JSR     OUTCHR
3143 8610               LDA     #$10
3145 BD800F             JSR     OUTCHR
3148 8600               LDA     #$00
314A BD800F             JSR     OUTCHR
```

```
314D 86E0              LDA   #224
314F BD800F            JSR   OUTCHR
3152 861B              LDA   #$1B
3154 BD800F            JSR   OUTCHR
3157 8649              LDA   #$49
3159 BD800F            JSR   OUTCHR
315C 8602              LDA   #$02
315E BD800F            JSR   OUTCHR
3161 8600              LDA   #$00
3163 BD800F            JSR   OUTCHR
3166 318C5B            LEAY  STORE,PCR
3169 D6B6              LDB   $B6
316B C104              CMPB  #4
316D 271A              BEQ   PR4
316F C6FE      PR0     LDB   #$FE
3171 E78C4F            STB   CHRNO,PCR
3174 8D29      RPT0    BSR   PROUT
3176 313E              LEAY  -2,Y
3178 8D25              BSR   PROUT
317A E68C46            LDB   CHRNO,PCR
317D C100              CMPB  #00
317F 26F3              BNE   RPT0
3181 8D1C              BSR   PROUT
3183 313E              LEAY  -2,Y
3185 8D19              BSR   PROUT
3187 2010              BRA   ENDPR
3189 C6FF      PR4     LDB   #$FF
318B E78C35            STB   CHRNO,PCR
318E 8D0F      RPT1    BSR   PROUT
3190 E68C30            LDB   CHRNO,PCR
3193 C100              CMPB  #00
3195 26F7              BNE   RPT4
3197 8D06              BSR   PROUT
3199 861A      ENDPR   LDA   #$1A
319B BD800F            JSR   OUTCHR
319E 39                RTS
319F A6A0      PROUT   LDA   ,Y+
31A1 BD800F            JSR   OUTCHR
31A4 A6A0              LDA   ,Y+
31A6 BD800F            JSR   OUTCHR
31A9 8600              LDA   #00
31AB BD800F            JSR   OUTCHR
31AE BD800F            JSR   OUTCHR
31B1 6A8C0F            DEC   CHRNO,PCR
31B4 39                RTS
31B5           PASCNT  RMB   #1
31B6           ROWCNT  RMB   #1
31B7           BYTCNT  RMB   #1
31B8           STOST   RMB   #2
31BA           PATNO   RMB   #2
31BC           PASNO   RMB   #1
31BD           ROWNO   RMB   #1
31BE           PPAT1   RMB   #1
31BF           PPAT2   RMB   #1
31C0           PPAT3   RMB   #1
31C1           PPAT4   RMB   #1
31C2           EROR    RMB   #1
31C3           CHRNO   RMB   #1
31C4           STORE   RMB   #1
31C5                   RMB   #$FF
32C4                   RMB   #$FF
33C3                   RMB   #1
33C4           STOEND  RMB   #1
33C5
```

LISTING 2

```
3001                   *COPYRIGHT J R HATTON
3001                   *MARCH 1987
3001   800F    OUTCHR  EQU   $800F
3001 3436              PSHS  Y,X,A,B
3003 D6B2              LDB   $B2
3005 C100              CMPB  #00
3007 260A              BNE   BLK
3009 C643              LDB   #$43
300B E78C1E            STB   INVTA,PCR
300E E78C40            STB   INVTB,PCR
3011 2008              BRA   START
3013 C612      BLK     LDB   #$12
3015 E78C14            STB   INVTA,PCR
3018 E78C36            STB   INVTB,PCR
301B 8E23E0    START   LDX   #$23E0
301E AF8D00D1  ROW     STX   COLST,PCR
3022 8D4C              BSR   INIT
3024 C6C0              LDB   #$C0
3026 E78D00CB          STB   COUNT,PCR
302A A684      COLMA   LDA   ,X
302C 12        INVTA   NOP
302D 84F0              ANDA  #$F0
302F 47                ASRA
3030 47                ASRA
3031 47                ASRA
3032 47                ASRA
3033 8D6E              BSR   PRINT
3035 3088E0            LEAX  -$20,X
3038 6A8D00B9          DEC   COUNT,PCR
303C 26EC              BNE   COLMA
303E 861A              LDA   #$1A
3040 BD800F            JSR   OUTCHR
3043 AE8D00AC          LDX   COLST,PCR
3047 C6C0              LDB   #$C0
3049 E78D00A0          STB   COUNT,PCR
304D 8D21              BSR   INIT
304F A684      COLMB   LDA   ,X
3051 12        INVTB   NOP
3052 840F              ANDA  #$0F
3054 8D4D              BSR   PRINT
3056 3088E0            LEAX  -$20,X
3059 6A8D0098          DEC   COUNT,PCR
305D 26F0              BNE   COLMB
305F 861A              LDA   #$1A
3061 BD800F            JSR   OUTCHR
3064 30891001          LEAX  $1001,X
3068 8C2400            CMPX  #$2400
306B 26B1              BNE   ROW
306D 3536              PULS  X,Y,A,B
306F 39                RTS
3070 861B      INIT    LDA   #$1B
3072 BD800F            JSR   OUTCHR
3075 8647              LDA   #$47
3077 BD800F            JSR   OUTCHR
307A 861B              LDA   #$1B
307C BD800F            JSR   OUTCHR
307F 8610              LDA   #$10
3081 BD800F            JSR   OUTCHR
3084 8600              LDA   #$00
3086 BD800F            JSR   OUTCHR
3089 8660              LDA   #96
308B BD800F            JSR   OUTCHR
308E 861B              LDA   #$1B
3090 BD800F            JSR   OUTCHR
3093 8649              LDA   #$49
3095 BD800F            JSR   OUTCHR
3098 8603              LDA   #03
309A BD800F            JSR   OUTCHR
309D 8600              LDA   #$00
309F BD800F            JSR   OUTCHR
30A2 39                RTS
30A3 5F        PRINT   CLRB
30A4 46                RORA
30A5 59                ROLB
30A6 59                ROLB
30A7 59                ROLB
30A8 59                ROLB
30A9 46                RORA
30AA 59                ROLB
30AB 59                ROLB
30AC E78C47            STB   TEMP,PCR
30AF 59                ROLB
30B0 59                ROLB
30B1 EB8C42            ADDB  TEMP,PCR
30B4 E78C40            STB   PTEMP,PCR
30B7 5F                CLRB
30B8 46                RORA
30B9 59                ROLB
30BA 59                ROLB
30BB 59                ROLB
30BC 59                ROLB
30BD 46                RORA
30BE 59                ROLB
30BF 59                ROLB
30C0 E78C33            STB   TEMP,PCR
30C3 59                ROLB
30C4 59                ROLB
30C5 EB8C2E            ADDB  TEMP,PCR
30C8 1E89              EXG   A,B
30CA BD800F            JSR   OUTCHR
30CD A78C26            STA   TEMP,PCR
30D0 A68C24            LDA   PTEMP,PCR
30D3 BD800F            JSR   OUTCHR
30D6 8600              LDA   #00
30D8 BD800F            JSR   OUTCHR
30DB BD800F            JSR   OUTCHR
30DE A68C15            LDA   TEMP,PCR
30E1 BD800F            JSR   OUTCHR
30E4 A68C10            LDA   PTEMP,PCR
30E7 BD800F            JSR   OUTCHR
30EA 8600              LDA   #00
30EC BD800F            JSR   OUTCHR
30EF BD800F            JSR   OUTCHR
30F2 39                RTS
30F3           COLST   RMB   #$02
30F5           COUNT   RMB   #$01
30F6           TEMP    RMB   #$01
30F7           PTEMP   RMB   #$01
30F8
30F8
```



A Composer at Ossett

George and Jonathan Cartwright start out reminiscing and find themselves answering difficult questions

TELLING friends that you are going to spend a day in Ossett demonstrating at a computer show brings forth a flurry of comments. "Where?","You're going to do *what*?", "What's a Dragon?", "Why?", and so on. The last question is easy to answer.

Having submitted a high resolution text utility last year to John Penn for evaluation, it transpired that the launch of our software would be at the *First* John Penn show at Ossett. We set to work producing some demonstration programs in the hope of catching the eye of some other software houses. At the time we had three games and *Composer Companion* in development. The 1986 show gave us the chance to talk to people in the business and chat to that band of diehard Dragon users who keep the computer alive.

All the comments (cruel and constructive) we absorbed in that first show gave us the confidence to continue developing, resulting in five programs being accepted by a software house the following December. (*Now you know what shows are for, folks — Ed.*)

This year we were kindly asked to attend Ossett again. The biggest job was packing all the gear into the car for the journey across the Pennines. However, the effort was worth it, and soon we were talking non-stop to Dragon fans. Many of the people who visited our stand had been at the 1986 show and they actually remembered us! Greetings to Mr. Holliman from Harrogate, and also to Stuart Beardwood and the kids from Westgarth Children's Home. Stuart's computer work with disabled children deserves the support of Dragon fans (see DU Oct. '86 and Feb '87).

An anecdote at this point may give the readers some insight into the saying "It takes all sorts to make a computer show". The owner of one stand was asked if he would like to buy a new program. We were asked if we would load this game so that an on-the-spot assessment could be made. This game was a 'shoot'em up' type and graphically very good. The vendor wanted to sell it outright for a LARGE sum of money (don't we all?). In these days of a static market, such deals are a thing of the past!

At the Quickbeam stand I talked to Wayne Smithson and discovered that SuperDOS doesn't need to be soldered into the controllers. Not a lot of Cartwrights knew that. I had been apprehensive about the juxtaposition of a soldering iron and a Dragon for some time. So off I went to Harris Microsoftware and bought SuperDOS — a bargain that no disc user should be without.

There were a number of new releases — Wayne's *Superkid*, several from Microvision on both cassette and disc, *Crazy Footer* from Computape. New releases are a sign of support for the Dragon — long may that support last. Really heavy users were catered for by John Penn with OS-9, Compusense and Microvision with FLEX, and Harris with BASIC 42. Music was well represented with Chris Jolly's DAMS, David Makin displaying *Music Maker*, and us with *Composer Companion*.

Talking of *Composer Companion*, something that we were asked more often than "Can I have a leaflet?" was "How can I transfer *Composer* from tape to disc?". The method to transfer from tape to Dragon DOS, or compatible, is as follows:

1.CLOADM *Composer* into your Dragon with DOS detached (use the program in March 1985 DU).

2.Select the option to save a tune to tape as M/C (you don't actually have to write a tune, if the program finds no tune in memory it just saves the *Composer* code itself. Note down the start, end and exec addresses of the program.

3.Switch off your Dragon then switch it on again, no need to detach DOS this time.

4.CLOADM the tune you saved to tape.

5.SAVE it to disc with the start, end and exec addresses that you noted down.

Having done this you can load in *Composer Companion* and it will run perfectly. Anytime you subsequently wish to use *Composer Companion* simply load up the saved tune first. I hope this is of use to people.

Since several hundred people have bought our HIRESTEXT program (still available at a knockdown price of £3 from John Penn) I suppose I'd better tell you how to convert that from tape to disc. Once again this conversion is for Dragon DOS.

1.Power up your Dragon with DOS installed.

2.PCLEAR6:CLOADM"RES-TEXT", 1536

3.Enter the following program and run it:

```
0 '"RES-TEXT" FOR DRAGONDOS CONVERSION PROGRAM
1 '"FIRST CLOADM"RES-TEXT",1536
2 '"THEN RUN THIS PROGAM
3 '"PLEASE ADD 1536 TO ALL POKES REGARDING 'RES-TEXT'
4 '"I.E. POKE10005+1536,255 FOR INVERSE
10 FOR I=&H2C00 TO&H2C88
20 RESTORE:PRINTI:A=PEEK(I)
30 IF A=&H1E THEN POKEI,&H24
40 IF A*256+PEEK(I+1) &H2C00 THEN 60
50 NEXT
60 B=PEEK(I-1)
70 READ P$:IF P$="*" THEN NEXT:GOTO110
80 IF B=VAL("&H"+P$) THEN N90 ELSE 70
90 A=A+6POKEI,A:NEXT
100 DATA B7,10,BF,C3,FD,FC,BE,F7,F6,B6,*
110 PCLEAR6:DEFUSR0=9728+1536
120 PMODE4,1:SCREEN1,1:PCLS
130 X=0:Y=0:A$="DRAGONDOS CONVERSION PROGRAM":GOSUB150
140 SCREEN1,1:GOTO140
150 POKE10012+1536,Y:POKE10013+1536, X:Z=USR0(VARPTR(A$)):Y=PEEK(10012+1536):X=PEEK(10013+1536):RETURN
```

4.SAVE the newly converted program to disc using:

```
SAVE"RESTEXT.BIN",7680+1536,10015+1536,41194
```

5.From now on all pokes regarding the program are as follows:

```
POKE 10013+1536, X co-ord of text
POKE 10012+1536, Y co-ord of text
POKE 10005+1536, 255 — Inverse text
POKE 10005+1536, 0 — Normal text
DEFUSRO=9728+1536
```

6.The designer program on the tape will not work with the disc version. Therefore you must write your own or design your character sets using the tape version of HI RESTEXT and then convert them to disc.

I have also been asked how to convert HI RESTEXT to run on the 64. Not owning a 64 I can't test this but here goes ...

1.Load up the tape version of HI RESTEXT as normal.

2.Find out the 64 equivalent of ROM routine S8B27 from your local whizz-kid.

3.POKE this value into locations S2601 and S2602. The program should then work as usual.

Tandy Co-co owners should be able to use the program by poking the Co-co equivalent of ROM routine S8B27 into the same locations as above. (The designer program will have to be converted by a Dragon owning friend into Tandy ASCII, however.)

I think we've just about got time for a quick plug! Many people saw our unfinished game *Rolaball* at Ossett, some even thought it was *Airball*! Well, it is now finished. It is a 3D game with a *Marble Madness* style landscape which covers 49 screens. Having attracted the attention of the gamers who read this magazine, all we will say now is that it is in the hands of a software house who are, at this very moment, trying to last more than 30 seconds without getting killed!

Well, that's about it. Who said programmers don't care? What more do you want — blood? (*Hoppit, Jon — that's editorial territory!*)

Winners and Losers

Every month, Gordon Lee will look at some prize programming points from a previous month's competition

THE insertion of a single word in the May competition would have made all the difference! How I wish that I had specified sets of *common* words — or even *reasonably common* words — or even *sorts of words that the average man in the street is likely to know if he hasn't a copy of the OED stuffed up his jumper!*

As it was, all sorts of sequences came flooding in, rich with the dredgings from numerous dictionaries. Let me confess that I would have been quite happy with the two sets of four words that almost every entrant managed to find:

GOD OWL SAP WET
ADD BEE ILL LOO

(Incidentally, 'loo' is a card game, but the more usual meaning is alright by me!)

I must share the sentiment of E.A. Newman who ends his letter with the philosophically optimistic words — 'I look forward to hearing about the sets I have missed in due course'. Well, E.A., some of the more bizarre attempts will follow in due course, but first, what methods did our competitors use?

The minority choice was to use a vocabulary of several hundred words typed into DATA lines. Each word is taken in turn, the 'offset' of the second and third letters is calculated, and the remaining list of words is scanned for other words having an identical offset. The limitation of this method is that it can only be as comprehensive as its list of words, and also, the selection of just three-letter words can be difficult. A crossword compiler such as Cassell's is ideal for this purpose.

By far the most popular method was to generate all possible permutations of three-letter sequences. A condition was usually included to reject all sets which did not contain a vowel (or 'Y'). The set was displayed and the operator either accepted or rejected it, depending on whether it was an acceptable word. In the event of an acceptance all other three-letter combinations containing at least one vowel were displayed. By inspection the sets of four (or more!) words were compiled. A representative example (from Keith David) is shown.

And now for the results (at least the ones that we can print!). Taking as reference *Chambers Twentieth Century Dictionary* (1972 edition), I'm disallowing ewk, ahm, ahu, adc, apl, taf, and ivo — whatever they might mean. Nevertheless, the amazing erudition of our competitors provided no shortage of sets of four words and, amazingly, a few five word sets! From Keith David comes:

DAN HER IFS ROB URE
ALS ITA PAH TEL WHO
CRY ETA FUB LAH TIP

Keith also included five-word sets using GJU, HUH, and CEL — sorry! not in Chambers'.

Jake Anderson supplied:
CRY ETA FUB LAH TIP
CHA DIB PUN VAT TYR
ARK DUN JAT RIB ULE

Of the four-word sets there were too many to print, but here is a bit of modern verse compiled from some of them:

Dan her rob ifs, ann err ree boo,
Dom jus pay tec, add bee ill loo,
Cly fob ire ran, bod erg nap ret,
Dal hep lit spa, god owl sap wet.

Bum has lew pia, dso law pea tie,
Foh irk rat vex, fah mho nip wry,
Daw lie rok urn, ids jet nix tod,
Bop ers nab ref, awl dzo mix sod.

I don't expect it means much — but it sounds good, don't you think?

(*That just about takes the biscuit for Vogan verse, Gordon. We didn't know you had it in you — how about taking it back?! — Ed.*)

```
Keith David's Word-Generating Program.

   10 CLS
   20 A$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
   30 FOR B=0 TO 25
   40 FOR C=0 TO 25
   50 B$=RIGHT$(A$,26-B)+LEFT$(A$,B)
   60 C$=RIGHT$(A$,26-C)+LEFT$(A$,C)
   70 FOR X=1 TO 26
   80 Y$=MID$(A$,X,1)+MID$(B$,X,1)+MID$(C$,X,1)
   90 FOR N=1 TO 3
  100 Z$=MID$(Y$,N,1)
  110 IF INSTR("AEIOUY",Z$)=0 THEN NEXT N ELSE PRINT Y$,
  120 NEXT X
  130 I$=INKEY$:IF I$="" THEN 130
  140 CLS
  150 NEXT C,B
```

Communication

Send in your questions, requests, and pleas to Communication, Dragon User, 12-13 Little Newport Street, London WC2.

Problem: I need help in converting Dragon games to disc under SuperDOS.
Name: K. Hunt
Address: 11 Demarnham Close, West Bromwich, W. Midlands, B70 5RJ

Problem: Has anyone got a Sanyo DR101 recorder for sale?
Name: T. Connor
Address: 9 Kenvington Drive, St. Paul's Cray, Orpington, Kent

Problem: I have a Logitec FT-5000 printer, made by the Kanto Denshir Corporation of Japan. Unfortunately I have not got a printer manual, and I have not been able to find an agent in this country as yet. Has anayone heard of them? Has anyone got a manual? The printer seems to run on a mixture of Epson, Star and IBM codes.
Name: George Dawson
Address: Me and My Girl, 18 Caroline Close, Alvaston, Derby DE2 0QX

Problem: Do you know where I can get any informafion of Floating Point Mathematics routines for the Dragon or 6809 microprocessor based systems?
Name: R. W. Fair
Address: 10, Wilford Place, Hartshill, Stoke-on-Trent, Staffs ST4 7LL

Expert's Arcade Arena

**Write to 'The Expert' at Dragon User
12-13 Little Newport St, London WC2H 7PP.
with all your arcade tips and hints.**

MANY many moons ago Dragon owners were introduced to a Mr. Paul Burgin by virtue of three programs, titled simply 'Program A', 'Program B', and 'Program C'. Ever since their publication in this magazine, and in particular with reference to their use in this column, there has been nothing but letters either saying 'The man's a genius' or 'These things don't work!'.

It has often been observed that human beings are quicker to criticise than praise and this was certainly true where Mr. Burgin's fans were concerned. It is for this reason that this month I turn the matter over to the man himself, or at least to his own two 'hacking sheets'. I will trouble you little longer as page space is precious when duplicating something as complex as this and besides, at least if I get this over and done with I won't have to print these darn programs A,B, and C until everyone has to renew their subscriptions again next year.

The sheets are well worth looking over as they contain at least one reference back to this column (circles within circles)! The amateur hacker will find the Pokes useful especially as they come in the main with a clear instruction of how to load the game up and then operate the Poke.

These are the best presented hacking sheets I have seen as they pack a lot of information in to a small space without losing clarity. If anyone can do better without repeating the methods or pokes of these gems, then send 'em in. The reward? Erm, well I'll think of something stupid! And in the meantime may I be the first to congratulate Paul Burgin on being the first winner of the D.E.C. award (Dedicated Expert Column)?

Next month the column returns to its normal fab and groovy self with more pokes, maps, and waffle from me.

Your loving expert.

(And probably another hacking sheet from Paul Burgin, as we only have room for one this month — Ed.).

Adventure Contact

Adventure: *Ket Trilogy/Final Mission*
Problem: What are the five answers for the Guardians?
Name: R. Vaughan
Address: 189 Port Tennant Road, Port Tennant, Swansea, SA1 8JU

Adventure: *Tanglewood*
Problem: Cannot get Foghorn's glasses, I have got the Seer's hat. What next? Help!
Name: Mark Coops
Address: 16 willows Drive, Meirheath, Stoke on Trent, ST3 7LZ

Adventure: 1) *Tanglewood* 2) *Adventure Trilogy*
Problem: 1) How do I get the fishing rod off the stone gnome? 2) What do I do in the white void?
Name: Tim Entwhistle
Address: 8 Snapps Lcose, Wroughton, Swindon SN4 0RN

Adventure: *Fishy Business*
Problem: Can't raise portcullis or open the black door. I have the pearl
Name: Adrian Webb
Address: 22 Railton Road, Morris Green, Liverpool

Adventure: 1) *Fishy Business* 2) *Pimania*
Problem: 1) Getting started 2) Help sheet if possible, please
Name: John Haining
Address: Arranview, Somerset Street, Catrine, Ayrshire, Scotland KA5 6RF

Adventure: *Juxtaposition*
Problem: How can I gedt the Blue Key Card to open the door to the ground level?
Name: Scott Hadden
Address: 336, Cluny Place, Glenrothes, Fife KY7 4QY

GROSVENOR SOFTWARE

SUPERDOS: DragonDOS compatible disk operating system without the bugs. Mike Kerry, author of ALLDREAM has gone far beyond the patches listed in D.U. to produce a really reliable DOS at last. Strongly recommended as an upgrade for all DragonDOS 1.0 / 4.0 and Cumana 1.2 / 2.0 users.

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DR1

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DR60

HACKING SHEETS BY PAUL BURGIN. FREE

KEY	Substitute the brackets for the words below.
(A)	To load the program type "SKIPP:POKE126,4:POKE127,0:EXEC46941"
(B)	To load the program RUN the following. "10 FORK=31500To31510:READM:POKEK,M:NEXT:EXECK-11:DATA189,160,146,134,57,183,1,103,126,131,113"
(C)	To load the program type the program listed below then add the line 20 as detailed in the text.Finally RUN the full program. "10 PCLEAR1:CLEAR10:FORI=1800 TO 1851:READM:POKEI,M:NEXT:EXEC1800 30 EXEC PEEK(1546)*256+PEEK(1547) 40 DATA134,126,183,1,142,48,140,28,191,1,143,141,31,141,34,134,3,151,0,142,64,0,141,9,10,0,38,247,190,64,12,159,0,126,183,91,158,0,141,7,141,2,53,144,142,6,0,159,126,126,185,51"
(D)	Load the program as normal,then,when loaded,press the RESET button,
(E)	Load the Program normally using CLOADM but before typing EXEC, enter the command......
(F)	The built-in cheat system is as follows......
(G)	This gives infinite lives!
(1)	Player 1
(2)	Player 2
(LIVES)	Substitute this for the number of lives you would like.
(LIVES=n)	The maximum lives allowed is "n".

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DRAGON 32K ONLY

BORIS THE BOLD-(E)POKE 19411,(LIVES)

KATERPILLAR ATTACK-To load type "SKIPP:CLOADM" then POKE10739,(LIVES) or POKE10585,125 (G) To run type EXEC

CRAZY PAINTER-(A) POKE 9953,(POTS OF PAINT AND BRUSHES=64) or POKE 10014,125 (INFINITE BRUSHES) or POKE10806,125:POKE11798,125 (INFINITE POTS OF PAINT) Finally EXEC16384

CUTHBERT IN THE JUNGLE-(A) POKE11452,(LIVES) or POKE9916,13 (G) then EXEC 16384

CUTHBERT GOES DIGGING-(A) POKE 11675,(LIVES):EXEC 4096

HUNCHBACK-(D) POKE25384,(LIVES):EXEC 25280

THE TOUCHSTONE-(D) POKE22384,255:EXEC16384 This slows down the generation of new monsters.

GALACTIC AMBUSH-(D) on the score table. POKE 13331,(LIVES=not many) or POKE 14783,125 (G) Finally EXEC 12936

DEVIL ASSAULT-(B) POKE 14279,(LIVES) or POKE 14553,125 (G) To run EXEC 768

FIRE FORCE-(F) When selecting colour, press A then C, then enter codes "IMFTC","UGLY" or "TECHNIX" for different levels and/or "ENDLESS" (G). Also "POKE114,171:POKE115,205" before loading will access the autosave.

JUNIORS REVENGE-(C) 20 POKE 19529,("PLAY" game LIVES)

SPACE FIGHTER-(A) POKE16598,(MISSILES):EXEC 27392

ATHLETYX-(C) 20 POKE15058,39 This gives maximum speed with little effort.

INVADERS REVENGE-(E) POKE14719,(LIVES)

DONKEY KING-To load type "SKIPP:CLOADM" then POKE12914,(LIVES):EXEC

PLANET INVASION-(E) POKE7438,(LIVES=14) or POKE10906,125 (G)

SCARPMAN-To load type "CLOADM"",49152:POKE2062,0:EXEC" This gives 256 lives

LUNAR ROVER PATROL- (E) POKE22312,(LIVES)

KING TUT-POKE 7953,(LIVES) or.POKE 10271,13:POKE 8257,13 (G)

BEAM RIDER-(D) POKE 7783,(LIVES) or POKE11840,13 (G) To run EXEC 7683

CAVERNS OF CHAOS-(F) Type "PIGLET" on the title page, depressing each key for a few seconds.If successful then use "E" to access the next screen.

MORRISON CHESS-(D) POKE 8401,224:EXEC 7700 This improves the colour.

PEDRO-Use "SKIPF:SKIPF:CLOADM" to load, then any of the following pokes, EXEC to run. POKE23603,&H(SEEDS=99) POKE 23620,&H(BRICKS=99) POKE20475,77 (INFINITE SEEDS) POKE20513,77 (INFINITE BRICKS) POKE 16047,125 (Stops tramps ability to steal seeds!)

TEA TIME-(C) 20 POKE 16443,(LIVES=15) or POKE 19996,109 (G)

JET BOOT COLIN-(C) 20 POKE 7230,(LIVES) or POKE8759,77:POKE9099,77 (G)

COSMIC ZAP-(D) POKE 7956,(LIVES)+1 or POKE 7981,13 (G) To run EXEC 13569

ESCAPE-Code is "79245" or (E) POKE 12401,33 allows anything.

CUTHBERT IN THE COOLER-POKE 8295,(LIVES=14)

SHOCK TROOPER-(C) 20 POKE 13895,(LIVES) or POKE 17075,125 (G) (F) during a game press "P,shift+0,R,shift+S" this gives a message and then you cannot be killed by bullets.

DUNKEY MUNKEY-POKE 15120,(LIVES=127)

NOW 73 GAMES !!!

FEARLESS FREDDY-(C) 20 POKE 28052,(LIVES)

DANGER RANGER-(B) POKE 10510,(LIVES):EXEC768

TIME BANDIT-See page 28 of Dragon User NOV 1986.

TOTAL ECLIPSE-See "Arcade Arena" in Dragon User AUG, SEPT & NOV 1986.

DRAGON HAWK-(A) POKE 11590,(LIVES=127):EXEC 4096

CUTHBERT GOES WALKABOUT-(B) POKE15389,33 makes you immune to monsters and POKE13406,125 (G) Run with EXEC 768

Write: ADVENTURE

What is that strange creature which keeps popping up? It must be ***Pete Gerrard****!*

IN this month's *Adventure Trail* a little bit of space was devoted to a crop of games from Simon Hargrave, and a quote used to describe them mentioned 'mobile creatures'. So, how would you go about programming such a beastie into your own programs? Perhaps more importantly, what is such a beastie?!

Just about every adventure that I've ever seen has, by virtue of being an adventure game, you, in your role as player, as either the hero or the villaim of the piece. You are the one who makes the decisions and controls the action, deciding what to do when and where, and how to go about doing it. But, even going back to the very first *Colossal Cave* adventure, there were always other characters, or mobile creatures, involved ...

The annoying pirate would steal your treasure and the even more annoying dwarf would leap out on you from time to time and indulge in a knife fight. The pirate would appear whenever certain conditions in the game were met, and you (the player) would have to be carrying at least one treasure before he would put in his appearance. The dwarf would leap out, always throwing a knife which missed on a first encounter, and thereafter indulge in some tiresome and, let's face it, boring combat: he was a nuisance who couldn't be avoided. One can see that there was nothing particularly sophisticated about those two, and later adventures saw something of an advance on these early ideas.

Moving on a year or two, Infocom's *Starcross* had a whole host of characters in it, from native chieftains that you had to barter with to get a brown rod, to enormous spiders with a fascination for tape recorders, and meeting along the way the infuriating mechanical maintenance mouse, always clearing up any debris he might find lying around. He had a capacity for going through a hole in the wall that immediately closed up behind him, thus barring your progress. A tricking problem, until solved with the aid of a couple of thin diskcs. The number of times that I tried to disguise myself as a piece of rubbish and lie down on the floor, thus provoking the mouse into picking me up (or so I thought) was legion, and needless to say it never worked at all. The thin disks hold the key.

Any other games, like *Lord of the Rings* and *The Hobbit*, featured characters of varying degrees of intelligence, including the now-legendary Thorin and his total inability to do anything other than sit down and sing about gold, or so it seemed. Certain characters were obviously essential to the completion of the game, like Elrond and his ability to read a map (*and serve lunch — Ed.*). Gandalf's propensity for showing up in the most unlikely (but welcome) circumstances, Balin failing to make it onto Bullseye and guesting in a computer game, and a variety of inhuman opponents such as wargs and trolls.

How do we go about controlling them?

Back in Time

If you remember your *Colossal Cave* you'll no doubt recall the bear, a ferocious beast easily tamed with a morsel of food and, once freed from his golden chain, blessed with the ability to attach himself to you like a limpet and follow you around for days. Follow you onto the bridge, too, if you're not careful, sending you both plummeting downwards into a bottomless abyss while reaching for the orange smoke. Now something like that is relatively easy to program. Once the bear has been fed and the chain removed we could set a variable flag, BF for example, and then everytime we came round to the WHAT NOW prompt just check to see whether or not BF was set. If it was, then print up the message 'You are being followed by a large, tame bear,' but if it wasn't then don't print anything and just carry on as normal.

Character could be given to the bear quite easily. If, for instance, you dropped two things at the same time and the flag BF was set you could print 'As you drop the (whatever) the bear runs away, thinking you're throwing something at it. However, it soon calms down and returns to your side.' When you approach the bridge and the troll asks for his treasure (the original troll booth perhaps?), and provided once more that the bear flag is set, you would print up 'The troll screams at the sight of the bear and runs away shrieking. The bear starts to follow but soon comes back to your side again.' That way you solve the problem of the troll but still leave the player with the possibility of walking onto a ricketty old bridge with an enormous animal by his side. The weight is more than the bridge can bear, of course.

Of Dwarves and Pirates

The dwarf and the pirate are similarly easy to program. Provided that the player's current position falls within a given range (can't have the dwarf leaping out from behind a rock in the well house) you could use the random function of your computer. Like this, for example:

```
IF (CP>10 AND CP<50) AND RND(100)>95 THEN DF=1
```

Here we set the dwarf flag, and program control could leap off somewhere and engage you in a duel with the dwarf. Cheking for the pirate would follow the same sort of lines:

```
IF (CP>30 AND CP<40) AND RND(100)>98 THEN PF=1
```

and again you'd set the appropriate flag. Then, by whisking program control away somewhere you could check to see whether the player was carrying any treasures or not, and provided that he has removed them from him and let the bearded pirate carry them away to his treasure chest deep in the maze, with a yo ho ho and a bottle of rum thrown in for good measure. If he wasn't carrying any booty worth stealing then carry on as if nothing had happened.

But that is all (dare I say it) fairly straightforward stuff, and in the increasingly sophisticated adventures that we are now seeing the player is beginning to get used to ever more complicated scenes.

Other Characters

I once wrote a spoof version of *Colossal Cave*, called *Enormous Cave*. Looking back at that program I'm forced to say that I am terribly embarrassed by the parser that I used (so primitive by standards nowadays), but one thing that I'm most definitely not embarrassed by was the use of a character called Eddie. In the game you played the traditional role of exploring caves and finding treasures, although everything had been moved about and solutions to problems were not quite what they used to be, and during these explorations you bumped into Eddie. He was an underground dweller, a Neil of Young Ones fame really, who probably hindered more than helped, but was essential for the complete solving of the game. You could talk to him, ask him to do things, sometimes he followed you and sometimes not, depending on your behaviour, and overall he behaved like a hippy companion of the caves would be expected to behave. He was, in other words, an integral part of the adventure: the sort of person you'd move away from if you met them in the pub, but deep underground when there's no-one else around you have no choice in the matter.

This sort of character is reasonably easy to introduce into a game, but presumably you won't always want a dememted hippy walking around and blundering through your adventure. Other, perhaps multiple, characters are just as useful, and could also be added without any undue problems. Exactly what wort of character you use is obviously up to you and your adventure, but they do add to the game as a whole. It's hard enough in real life to walk through a town without meeting people leaping off buses and saying hello to you, so to wade for months through an unknown land facing unknown hazards in a maze of tunnels and corridors, without bumping into anyone, is pretty much well nigh impossible. Bit like shopping in Wigan, really.

Unfortunately for us the problems increase with the more characters that you have. A western adventure that I once did solved this problem by only making a couple of them into really intelligent chaps, giving you the ability to talk to them and ask them to do things, whereas the others just appeared and either shot at you, attempted to rob you, and whenever you asked them a question they pleaded deafness and walked away.

This isn't too hard to control, if you use a 'say' verb, as in "say to Wyatt Earp 'shoot the sherrif"'. Then you could analyse the first part of the sentence, so that we know that the player wants to talk to Wyatt Earp, and if Earp is one of those characters who can sometimes be persuaded to do something we can use the parser again to work through the rest of the input contained within quotes and see whether or not Earp is going to obey your instructions. He might or he might not, depending on how you've programmed him, whether or not he's got any bullets left, or any one of a collection of different parameters which will obviously vary from game to game.

If the character was one of those who would never do anything, you could just use a stock response like 'He looks at you as if you were mad, and walks away' or something like that, making sure that you then put said character into another location, so that if the player tried to talk to him again you could say 'Talking to yourself is a sure sign of madness', or whatever else you feel like telling the player when he's attempting to talk to someone who isn't there.

After this we just control all the rest of the characters in the game as if they were so many walls, doors, or othr inanimate objects. They do precisely what we tell them (like throwing axes or stealing treasures) and no more. This still gives them the illusion of reality without the player really knowing whether they are real or not. Obviously a dwarf throwing an axe or knife at you presents a real enough danger, but if he never does anything else then he can be more or less discounted from the rest of the game.

One simple trick that can be used in your games works as follows. I always try and have some kind of 'status line' on display, telling the player where he is, what his score is, how many moves he's had and how much times is left, if it's a time-related adventure. To tell him where he is you obviously can't print the entire room description out as part of one line, so an enormous piece of prose about the inside of a stable might be reduced to 'just inside the stable door.' Then you can use this to print up either 'You are just inside the stable door', or 'Wyatt Earp is just inside the stable door', using the same piece of description for the different characters.

Dragon Adventures

We can then find out where everyone is in the game (perhaps an extended 'look' command) by using all these short room descriptions. Saves on memory and adds to the game, so it can't be all bad.

Conclusion

next month, in response to a few requests, we'll take a look at building up a verb or two, so that you can see how that is done. Other characters might come into it as well, so we'll try and cram as many awkward things in as possible, thus making it (in the long run) easier for you to enter your own verbs, I hope!

Anyway, that'll have to do for this month. Bye for now.

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MIKE GERRARD'S ADVENTURE TRAIL

EVERY so often a little letter comes along that deserves printing in full, and anything that can cheer me up on a Monday morning while at the same time capturing the spirit of the true adventurer who will succeed no matter what, is most definitely one of those letters. From Edward O'Leary, who resides in Exeter, we have (after the usual greetings):

"Yet another cry for help, only eight years to retirement and it looks as though I'll spend them all trying to solve: *Caverns of Doom, Vortex Factor, Syzygy*. Hint sheets would be much appreciated (SAE hopefully enclosed).

"I have completed several adventures, although my time at the keyboard is limited by a demanding family.

"Love the articles on adventure writing, you have inspired a dream. My adventure: it will depict a middle aged adventurer, desperately running away, pursued by his loving and ever increasing family/relatives. His mission: to find the 'silent room', wherein lies that which all computer adventurers seek ... 'TIME' ...

"It's early morning, the sun is ... AARGH ... the noise, the family is astir ...

"Yours frantically"

There is a PS, which for Edward's sake I think I'd better print, before his ever increasing family/relatives take umbrage. He does say "PS Love them all really!" I'll believe you, thousands wouldn't. I think any member of a family who has ever played adventures can easily sympathise with Edward.

But onto more specific Dragon stuff, with the offers of help in exchange for help. First of all we hear from a chap by the name of Gareth Loxton, or it could be Roxton, since he is obviously destined at some point in his life to be a doctor and has started his training by learning how to write indecipherably. Actually most of his letter's all right, it's just the name that led me astray, but fortunately for us all (since he's offering solutions to a variety of games) his address is perfectly legible, and he lives at the rather apt 1 Rambler Close, Walwayne Court, Trowbridge, Wiltshire BA14 9SL.

Send the usual SAE for help on any of the following games: *Mystery of the Java Star, Pettigrew's Diary, The Ring of Darkness, Shenanigans, Dragon's Mountain, Calixto Island, Keys of the Wizard, Don't Panic, Mansion Adventure* and *Jerusalem Adventure*. A few old friends in that lot, I think.

Actually Gareth is very self-deprecating, for in his letter he tells me that he recently bought 15 adventures for the Dragon and after playing them for weeks he's only managed to solve ten of them. Good grief! 66 per cent success rate and the man's worried. I would refer to it as a major triumph, or Honda, to keep someone happy.

Having solved ten, we come to the five that he's stuck on, and once again a few old favourites are cropping up as per usual.

Backwards writing time again, which means that those nations that read from right to left will think that there's only a few words of common sense in the whole column, and the rest of it is an enormous clue for the world's biggest adventure. What do you mean, you think there's only a few words of common sense in it? Cheeky young pups. Anyway, onto *Vortex Factor*, where Gareth is stuck at opening the safe. Well, or should that be llew, presumably you haven't found the document with the combination on it, so (24/92/11 noitanibmoc) tnemucod teg, reward nepo, eciffo og to find out the secret. On the other hand if you have got the document and are being a bit on the esutbo side, then notianibmoc eht retne dna, tnemucod eht ta kool, eciffo eht ot og, and to do that you'll need to type laid nrut and enter the appropriate numbers from the document. Once open, you'll find a blue cartridge by efas kool, and aftr that you're on your own.

All touch typists should be made to take a course in backwards typing, it reduces my typing speed to absolutely nil.

Anyway, or yawyna, he also wants to know how to build the altar in *Black Sanctum*, or alter as I believe Gareth has referred to it. Alter the altar, perhaps. Here we go. You will need to find the rood delian after you've found the remmah, which is tpyrc eht ni, and then using that you can sdraob teg, slian teg, slian llup. With the aid of the was, which is tfol eht ni, you can then ratla eht ekam and ratla pord in the crypt to continue on in the game. Phew!

Onto *Syzygy*, and a solution which will make you kick yourself. Gareth wants to know how to enter the airless corridor with a suit full of holes. Well, if you htaerb dloh and then rodirroc retne you'll be all right.

Problems with *Tanglewood* next, which people seem either to solve relatively easily or are completely and hopelessly lost. Alas for Gareth he is one of the latter type, and wants to know how to get out of Dwarf Dive. Well, since another problem of his is getting into Schark Castle, I think we have a severe case of going about things the wrong way, here. I refuse to type all this in backwards, so if you don't want to know anything about Dwarf Dive then put a card over the next paragraph and read on after that ...

Send Bruce into Dwarf Dive and press the button to reset the lifts. Bring him out through the northern exit/entrance and down on the lifts to get the whiskers. Bring him out via eithr the southern or northern exit and transfer the whiskers to Goliath and get him to wear them. Finally, to complete Dwarf Dive, send Goliath in, down on the lifts and ladders and then get archangel from the lowest mushroom and give archangel to Beanbag. This is hard to complete without getting caught so use the Hold and Quit commands quite often.

So there.

How to get into Schark Castle? Similar sort of problem, you don't get in at all but get someone else to do it. Again, I'm not typing all this out backwards, so if you don't want to know, cover up the next paragraph.

Send Foghorn into Schark Castle carrying the batteries (after eating and dropping the catmint) through the southern entrance. Get the Jammer and install the batteries and use the Jammer in the cellar, after moving the coal, to fuse the eye. Next, send Foghorn up to the fourth level (strange light) and get the key. Exit the castle through the western door and unlock the boathouse and get the net. Then send Foghorn into the castle and out through the eastern door and home.

And that sorts out the castle, courtesy of someone whom we will be coming to later, and whom it is probably impossible to write a column about Dragons without mentioning. You know your name.

But first, a cheery little letter on shockingly bright yellow paper, why has a wasp just entered my room, PANIC!!

Sorry, cheery little letter from S. Robinson in Denby Dale, West Yorkshire. Wrong side of the Pennines, but still. For once, not a whinge, whine or moan in sight, just information for yours truly. And I quote:

"I have recently completed *Trekboer* and have a few tips. To kill the spider put it in the room with the red button. But you must drug him with the capsule first. To get past the forcefield you must get the amulet and "WALK FIELD". If you want any more tips don't hesitate to ask. I have also finished *Mansion* and *Franklin's Tomb*. Yours sincerely."

This is the stuff, this is what they want, Compost Corner! Short and sweet, no mucking about, no requests for eight thousand help sheets, vocabulary lists, maps and complete solutions for every Dragon adventure ever written, just concise and to the point. Aw!

Besides, anyone who can spell "capsule" as "capsual" deserves a mention.

Okay, okay, nearing the end and Simon Hargrave appears yet again. This is because, bless his word processor, I've just received a rather long letter from him, the sort of thing that if Moses had been given the choice between posting this and carting two enormous tablets of stone with the Ten Commandments engraved on them down a mountain, we'd still have the Ten Commandments and I would not have seen this letter. What is the boy doing, then?

I was going to say that he was being extremely prolific, but according to my dictionary the origin of the word lies with our Latin friends and means, literally, to make offspring. Since the example quoted is "my pet hamsters were so prolific that they soon needed a larger cage" (my hovercraft is full of eels, I know) I think I'll just say that he's been writing a lot of Dragon adventures, so if any of you lot out there are feeling adventure starved, here's a quick resume.

Starcrash I've already mentioned in a previous column, and following on from that we have part two of the saga, called *The King's Quest*. Here we're set on earth in the twelfth century wandering around a castle at the mercy of a Mad King. Charming.

The Meaning of Life (hello, hello) sees you in control of four characters who can work in various states, either normal, asleep, waiting and dead. Mobile creatures and real-time adventures eh?

The latest one Simon refers to as a 'monster' adventure, with around 200 locations and a full English parser if he can fit it into the memory. Hmmm. He describes it as being a bit like a science fiction *Madness and the Minotaur*, so if it can live up to that it should really be rather good. More details on this, and the rest, as and when Simon sends them on to me, but if you feel like diving in blind and buying one it'll set you back £5.00, available from the lad himself, Simon Hargrave, at Crawley Hill Farm, Uley, Dursley, Gloucestershire GL11 5BH. This includes the usual post and packing, by the way.

As well as writing all this lot, he has an extremely comprehensive list of solutions to adventures (apart from Scott Adams ones, which he says he can't stand!), so by sending him 20p and an SAE he'll send you back the required solution. Presumably he also has a list of all the solutions on offer, but since he neglected to mention this all important fact you'd better write and ask for one.

For some reason he's given me a few tips on some of his own adventures, but since I haven't seen them yet, and you probably haven't either, I think we'll skate quickly on to the end of this month's column and a saga that could go on, and on, and ...

Two issues ago I mentioned a magazine called *Adventure Contact*, published up her in Wigan by Pat Winstanley. Last issue I brought the sad news of its demise. Now, it has re-appeared again, with a different editor at the helm. Name and address if you want to send off for a sample copy (£1.00 I believe) of this interesting, though not Dragon specific, look at the world of adventures is Colin Page, Kingfisher Restaurant, 91 Palmerston Road, Boscombe, Bournemouth BH1 4HP. Yes, Kingfisher Restaurant, which makes me think of something that's a cross between the Restaurant at the end of the Universe and Fawlty Towers, but we shall see.

Okay chaps and chappesses, that's all for now. Bye.

Adventure Contact

To help puzzled adventurers further, we are instituting an Adventure Helpline — simply fill in the coupon below, stating the name of the adventure, your problem and your name and address, and send it to Dragon User Adventure Helpline, 12/13 Little Newport Street, London WC2H 7PP. As soon as enough entries have arrived, we will start printing them in the magazine.

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All around the square

When is a triangle a tetrahedron? **Gordon Lee** *figures it out.*

HOW many squares are there on a standard chessboard? I don't mean just the 64 small squares, but squares of a larger size as well. For example, there are larger squares which are made up of four of the smaller squares, and so on. And don't forget the single large square which encloses the complete board and which measures eight units along its edge.

If you manage to work that out, what about including rectangles as well as squares — and what about grids of a larger order than the 8 x 8 of the chessboard? Fortunately, there are mathematical formulae which can save us the bother of actually counting them by inspection. The total number of rectangles (including squares) is given by

$$\frac{(n^2 + n)^2}{4}$$

of which

$$\frac{2n^3 + 3n^2 + n}{6}$$

are squares, and

$$\frac{3n^4 + 2n^3 - 3n^2 - 2n}{12}$$

are rectangles (*not* including squares). In these expressions the value n is the order of the grid in question — so this would be equal to 8 in the case of a chessboard.

From these formulae we can readily determine that in the problem quoted there are a total of 1296 rectangles, of which 204 are squares and 1092 are not. Clearly, for any value of n, the total given by the first expression must be equal to the sum of the other two totals.

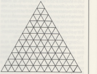
		n=8
△	$n(n+1)/2$	36
□	n^2	64
⧉	n^3	512
◬	$n(n+1)(n+2)/6$	120
◭	$n(n+1)(2n+1)/6$	204

A similar problem relates to a triangular lattice. This is taken from a puzzle book of the last century and asks for the total number of triangles which can be found. This is a more difficult problem than the one of the squares, not least because there are also triangles which point downwards as well. Once again, there is a mathematical expression which comes to our rescue!

$$\frac{n(n + 2)(2n + 1)}{8}$$

In this formula, if the value of n is odd, the division by eight does not come out exactly, so in this case ignore the remainder. So, in the diagram, which is of order 11, there are 411 triangles to be found.

Formulae can also be of great help when dealing with the 'figurate' numbers, reference to which is frequently made of these pages. The five principal figurates are triangular, square, cubic, tetrahedral, and pyramidal numbers, and by using the formulae given the nth term of any of the series can be easily found. The table gives the formulae for these figurates and, as an example, the value when n=8.



Problems are often found in which it is necessary to find values which belong simultaneously to two of the categories of figurate numbers. For example, what is the smallest number (not including 1) that can be both triangular and square? The answer is 36, this being the eighth triangular number and the sixth square number. There are an infinite number of triangular/square numbers but 36 is the smallest, and this forms the basis of the competition this month. Complete the grid so as to indicate the first *three* terms which match up in each of the pairs of categories as shown. We have started you off with the 36 in space (a). Note that we are **not** including 1 in any of the sections. Also, in section (e) we only require *two* values (there are only two!), and in section (f) only one as there is only one value that is both square and pyramidal.

Triangular	(a) 36	X	(b)	(c)
	Square	(d)	(e)	(f)
		Cubic	X	X
			Tetrahedral	?
				Pyramidal

Don't bother trying to fill in the other boxes. Those marked with an 'X' have been proved to be impossible. As for the box marked '?', although the existance of such a number has not been disproved, if one exists it will be so enormously large that it will fall outside the requirements of even these competitions!

Prize

Chuckie Egg and *Screaming Abdabs* have been around so long, and played so much (see the ongoing palaver in the hi-score corner...) that they have attained almost legendary status.

In keeping with *Dragon User*'s status as a legend in its own write, we have collared Computape (also a legend, of course) into putting aside a bundle of both games for the winners of this month's comp. So state your preference — y'never know, you might get it.

Rules

First, complete your grid. Secondly, print it out, along with any program notes you wish to include. Third, enclose said grid and printout in an envelope, along with your name and address, mark the whole caboodle OCTOBER COMPETITION, and send it to us here.

But not before completing the tiebreaker! To do that thing, peruse the sentence "I go to work on an egg because..." and send it along. We may put you to work on an egg...

July winners

Now, everyone knows that these competitions are judged entirely on the correctness of the solutions, the elegance of the programming and the ingenuity of the entrants' excuses for not getting it in till the last moment — but it never hurts to have a wizard tiebreaker as well! Few folk had any trouble solving the MUSIC MAKER problem, but some real raspberries were blown upon the English language, of which some of the best were:

Bits and PCs by the Dave Clark 101_2 (Dave Lardner)

We're All Going On A Summer Holiday by Buster Blackpool (Rachel Hart, all written out in music...)

It's So Easy by The Winners and *How Do You Do It* by The Losers (and most of our other contributors as well (Fred Taylor)

Supercalifragalistocexpialidocious by S.N.Error (John Smallwood)

503rd Symphony by Nockanuva Tunov (Richard Long)

and a very special mention for *Sweet Sixteen* by ex Emma d'Essimal (Fred Willers).

The ten best overall entries will be getting copies of John Penn Software's *Music Maker*, and the next ten will get £3.00 discount vouchers from the Penns. Stay tuned!

Solution

This month's solution is, we believe, on the opposite page.

The Answer

This is Gordon Lee's own
solution to the June competition
see page 24 for results

ANSWER: There are two possible substitutions for MUSIC MAKER:

13924 and 15876
or
23716 and 29584

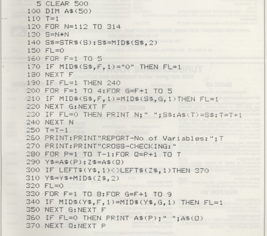
Solution: As there are nine *different* letters in the words MUSIC and MAKER each of the nine digits (1 to 9) must be used on a one-to-one substitution. First of all we need to find all perfect squares which consist of five differenct digits, then we need to select possible pairs from this list.

These possible values are computed in the loop 'N'. Each value in the range 112 to 314 is squared in turn, and the resulting value is placed in the string variable S$ (line 140). Because of the 'leading ' space placed in this string when the computer creates a string variable from a numeric variable, this extra character is removed using the MID$ command. The remaining five digits are then tested, first to see if a zero is present (lines 160 to 180), and then to check that all five digits are different (lines 200 to 220). A flag (FL) is set initially to zero for each test and is raised to 1 if either a zero or a duplicate digit is found. Values which pass both tests are then stored in the array A$().

This array is originally dimensioned to a size of 50 units, although in fact, only 42 numbers are eventually stored. Once this array is filled the program cross-checks the values that it contains for suitable pairs. To satisfy the terms of the question each pair of numbers should start with the same number (as both words commence with the letter 'M'), while all other digits should be different. The program takes each unit of the array in turn and compares with it all those values which are to be found further down the list (lines 280 to 290).

First, line 300 checks that both numbers commence with the same digit. Then all possible values are combined into variable Y$. This variable contains the whole of the first number and the last four characters of the second number. The final test (lines 330 to 350) checks to see that each of the nine digits contained in the string are different from each other. Those pairs that pass this test are then printed out.

This results in the two pairs of values given.



```
>
  5 CLEAR 500
100 DIM A$(50)
110 T=1
120 FOR N=112 TO 314
130 S=N*N
140 S$=STR$(S):S$=MID$(S$,2)
150 FL=0
160 FOR F=1 TO 5
170 IF MID$(S$,F,1)="0" THEN FL=1
180 NEXT F
190 IF FL=1 THEN 240
200 FOR F=1 TO 4:FOR G=F+1 TO 5
210 IF MID$(S$,F,1)=MID$(S$,G,1)THEN FL=1
220 NEXT G:NEXT F
230 IF FL=0 THEN PRINT N;" ";S$:A$(T)=S$:T=T+1
240 NEXT N
250 T=T-1
260 PRINT:PRINT"REPORT-No of Variables:";T
270 PRINT:PRINT"CROSS-CHECKING:"
280 FOR P=1 TO T-1:FOR Q=P+1 TO T
290 Y$=A$(P):Z$=A$(Q)
300 IF LEFT$(Y$,1)<>LEFT$(Z$,1)THEN 370
310 Y$=Y$+MID$(Z$,2)
320 FL=0
330 FOR F=1 TO 8:FOR G=F+1 TO 9
340 IF MID$(Y$,F,1)=MID$(Y$,G,1) THEN FL=1
350 NEXT G:NEXT F
360 IF FL=0 THEN PRINT A$(P);" ";A$(Q)
370 NEXT Q:NEXT P
```

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